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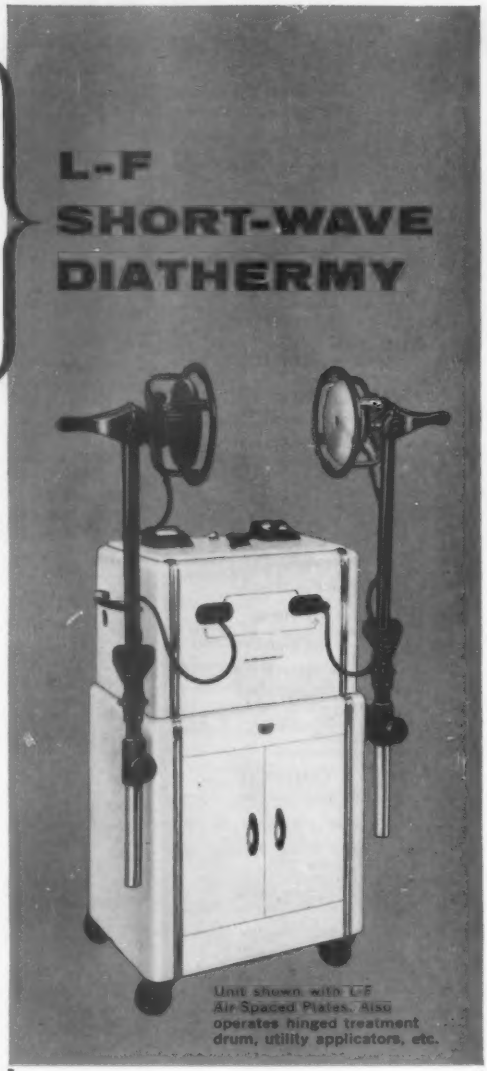

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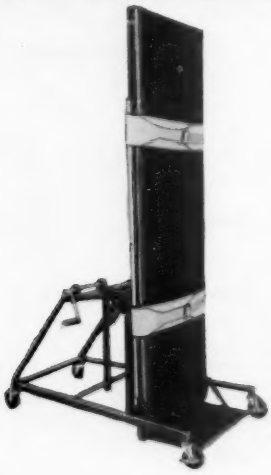

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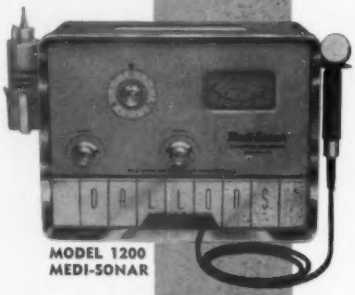

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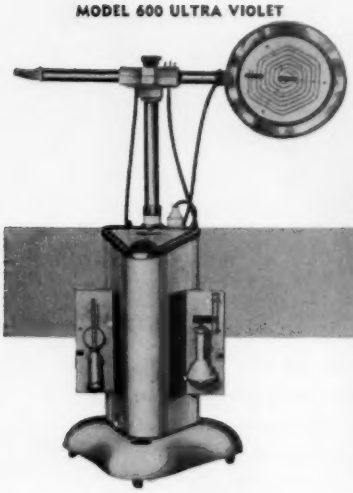

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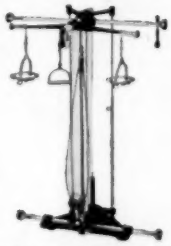

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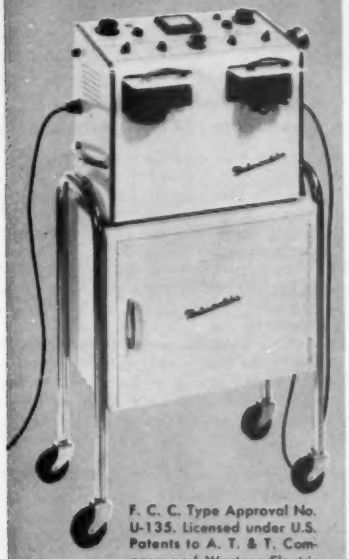

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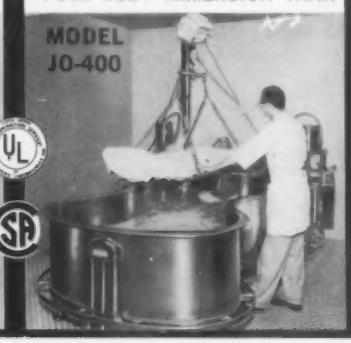

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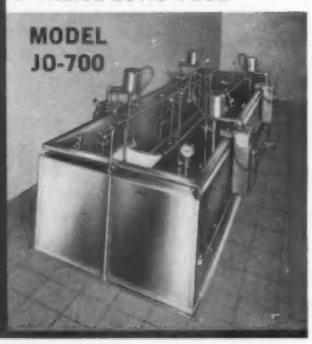

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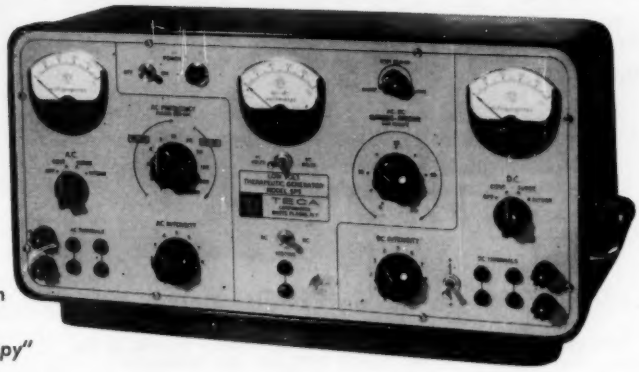

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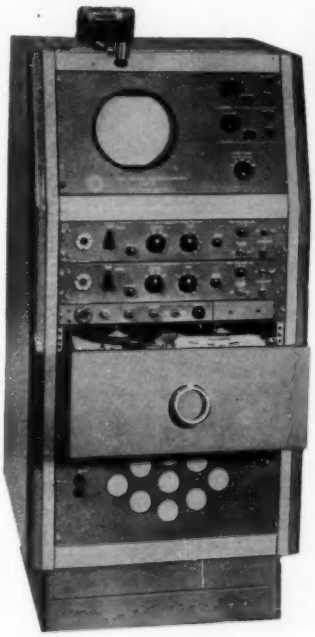

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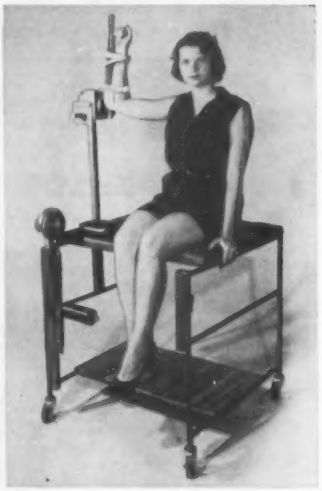

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ORIGINATORS OF THE "WALK-OFF" PHYSICAL THERAPY TABLE

An Analysis of the Rehabilitation Needs and Prognoses of 232 Cases of Cerebral Vascular Accident

Milton Lowenthal, M.D.
Jerome S. Tobis, M.D.
and
I. Ray Howard, M.D.
New York City

● Two hundred and thirty-two cases of cerebrovascular accident were admitted during a period of one year to a 1,000 bed municipal hospital. These cases represented four per cent of all medical admissions. They were evaluated and followed by the rehabilitation service. Descriptive material for the group includes analysis of such factors as age, sex, side of hemiplegia, mortality, previous episodes, etc. Physical and laboratory findings such as coma, incontinence, aphasia, blood pressure, muscle tone and cerebrospinal fluid were also recorded. The analysis of rehabilitation prognosis in the patients who survived the incident indicates that the presence of a rehabilitation service in a general hospital may favorably influence functional recovery in the hemiplegic patient.

In 1957 the department of physical medicine and rehabilitation of the New York Medical College-Metropolitan Medical Center began a study of patients admitted to the Metropolitan Hospital with the diagnosis of cerebral vascular accident. The study was originally planned with the primary purpose of collecting descriptive data on the early course (first two weeks) of illness. During the study it became apparent that if additional data were added to that already collected, information concerning rehabilitation prognosis and needs of the cerebral vascular accident patient could also be obtained. The study was therefore extended so that the data now available relate to the patients' entire course from admission to the hospital to time of discharge. The present report summarizes the first year of observation.

Method of Study

Metropolitan Hospital is a 1,000-bed municipal hospital which has a complete rehabilitation department as one of its services. The hospital population consists primarily of a low-income, laboring group. All medical admissions are processed through the admitting ward. This arrangement facilitated the examination of all patients admitted in coma or with a diagnosis of cerebral vascular accident. These patients were examined and evaluated by one of the authors (I. R. H.) usually within a few hours after admission, except for those patients admitted over weekends and holidays. When a diagnosis of cerebral vascular accident was established, a detailed neurologic and physiatric examination was carried out. The information obtained was recorded on a special form and included such factors as age, race, sex, associated disease, and past history. Physical findings such as blood pressure, coma, side of hemiplegia, muscle tone, pathological reflexes, and other data not included in this article were also recorded. The followup was carried out at intervals ranging from daily in the very early phases to weekly, until the patient had been discharged from the hospital. Rehabilitation services were available for all these patients; however, varied medical considerations determined the degree to which the full rehabilitation program was carried out in any individual case.

Results

There were 232 cerebral vascular accident patients admitted, which represents 4 per cent of the total admissions to the medical service. Sex distribution was almost equal, 121 males and 111 females (table 1).

There was no significant difference in the side of hemiplegia in the entire

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Table 1: Total Number of Cerebral Vascular Accidents in Relation to Number of Patients Admitted to Medical Service

Sex	Number Admitted to Medical Service	Number of Cerebral Vascular Accidents	Percentage of Total Admissions
Male	2,813	121	2
Female	2,801	111	2
Total	5,614	232*	4

*Average age, 67 years.

Table 2: Sex and Side of Hemiplegia

Sex	Right Side	Left Side	Side Undetermined	Total
Male	61	51	9	121
Female	49	50	12	111
Total	110	101	21	232

group—110 right and 101 left (table 2). There was also no significant difference when the data are distributed according to sex. The column heading "undetermined" in table 2 reflects the fact that 21 patients expired before a definite conclusion concerning the side involved could be made.

Ninety-eight patients (42 per cent) died (table 3). Death occurred in 82 per cent within two weeks after onset. Of the fatal cases, 89 (91 per cent) were above the age of 60, whereas in the total group, 77 per cent were above the age of 60.

Of the surviving group, 78 patients (58 per cent) received care either at the bedside or in the rehabilitation service at Metropolitan, Bird S. Coler, or Goldwater Hospitals. (See table 4; the latter two hospitals are chronic disease institutions with active rehabilitation services.) Eighty-five patients (63 per cent) were discharged home. Four (3 per cent) were discharged to nursing homes; 45 (34 per cent) were transferred to other hospitals (table 5).

Table 3: Mortality Rate

Sex	Age below 60 No.	%	Age above 60 No.	%
Male	4	4	39	40
Female	5	5	50	51
Total	9	9%	89	91%

Table 4: Patients Receiving Rehabilitation Care

Place	Rehabilitation Service	Medical Ward Program
Metropolitan Hospital	22	41
Other Hospital	15	..
Total	37	41

In most cases these observations were made by one of the authors (I. R. H.) or by other members of the rehabilitation service. For 61 patients who did not receive rehabilitation care, the information was obtained from doctors and nurses' notes and was considered adequate for these gross categories. Forty per cent were considered independent, 25 per cent partially independent, 32 per cent partially dependent, and 3 per cent dependent. The criteria for these categories appear with table 6.

Table 5: Disposition of Surviving Patients

Home No.	Home %	Nursing Home No.	Nursing Home %	Other Hospitals No.	Other Hospitals %	Total
85	63	4	3	45	34	134

Table 6: Functional Recovery of Surviving Patients at Discharge

Independent	Partially Independent	Partially Dependent	Dependent
53 (40%)	34 (25%)	43 (32%)	4 (3%)

Independent: No significant disability, able to carry out usual activities.

Partially Independent: Walked with cane and could carry out most of their usual activities.

Partially Dependent: Moderate disability, require some assistance in activities of daily living, walked short distance with cane and assistance.

Dependent: Bedridden, walked a few steps with assistance, incontinent, need help in most areas.

Table 7: Functional Recovery in Two Groups

Rankin		Our Study	
Independent or Partially Independent	Dependent	Independent or Partially Independent	Dependent
64%	18%	65%	3%

Discussion

The data in this one-year period support the position that cerebral vascular accident represents a significant problem. Patients with cerebral vascular accident make up about 4 per cent of admissions to the medical service in a large general hospital. Further, the mortality rate of 42 per cent emphasizes again the need for a more active approach to the patient early in the course of cerebral vascular accident. Patients in this study received only supportive therapy. The medical and neurological services did not feel that available technics such as stellate ganglion block or anticoagulant therapy are acceptable for routine application. Development of technics which would reduce this mortality rate would be of great significance.

Rehabilitation concerns itself with the surviving group, and the data obtained threw some light on the role of rehabilitation services in the early management of the patient with cerebral vascular accident. Our data are of particular significance when compared with a similar study of functional recovery in 206 patients reported in 1957 by Rankin[1, 2] at the Stubhill General Hospital, Glasgow, Scotland. The hospital population and age group of patients were quite similar. In Dr. Rankin's study, therapy was carried out on the ward. There was no formal rehabilitation program or a rehabilitation bed service. Table 7 compares the functional recovery in the two groups.

The results for patients who were discharged independent or partially independent are identical and probably reflect the fact that many of these patients recover spontaneously and rapidly and could benefit only minimally from therapy. The results in the dependent group reveal a significant difference which may be related to the availability to our patients of a more comprehensive rehabilitation program. Since the two studies were not originally designed for comparative purposes, one cannot go beyond the statement that the data suggest that active rehabilitation care provided by trained personnel may influence the degree of functional recovery in the more severely involved patient.

The results also emphasize the need to develop objective criteria for detecting early in the course of cerebral vascular accident those patients who would benefit maximally from rehabilitation care. Assuming, as noted above, that 65 per cent of the surviving group benefit only minimally from rehabilitation care, such criteria would enable rehabilitation to be intensified in the smaller group of 35 per cent. A special medical ward rehabilitation unit has been established which now assures that care is uniformly available to all patients and is seeking to define satisfactory criteria for case selection. It is anticipated that, with the improved case finding and services, the percentage of patients discharged in the category "independent or partially independent" will be increased.

The extent of rehabilitation services provided to the 134 patients is of considerable interest. As table 4 indicates, 78 (58 per cent) of the surviving group received some rehabilitation care either at the bedside or on a rehabilitation service. This is an impressive percentage, but a further analysis of the data is even more revealing. When we eliminate from the surviving group and the group under therapy those patients who remained in the institution for two weeks or less, the percentage of available patients who received therapy was increased to 75 per cent. It is anticipated that this percentage can be further increased as improved services become available.

The data collected in this study and the conclusions drawn are to some extent limited by the patient population. Whether these observations reflect the general problem of cerebral vascular accident or are peculiar only to our patient population can only be determined by a series of similar studies carried out at various types of institution.

Summary

A study of 232 admissions with diagnosis of cerebral vascular accident during a one-year period at a general hospital reveals that 42 per cent of the patients

died, most of these within a two-week period. Of the surviving group, approximately 36 per cent were discharged within a two-week period and about 75 per cent of those remaining beyond two weeks received some rehabilitation care.

The condition upon discharge of the surviving patients revealed that 65 per cent were either independent or required only slight assistance, whereas 32 per cent required moderate assistance and 3 per cent a great deal of assistance and were considered severely disabled.

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Temperature Rise of Various Tissues in the Dog on Exposure to Ultrasound at Different Frequencies

Jerome W. Gersten, M.D.
Denver

● Various areas of the anesthetized dog were sounded at frequencies of 490 kc./sec., 1 mc./sec., and 3 mc./sec., and temperatures were recorded in different tissues. In all situations tested, the effective depth of penetration at 3 mc./sec. was not great, as measured by temperature rise. With relatively superficial bone, the temperature rise at the bone surface was greater than that of overlying muscle when sounding was done at frequencies of 490 kc./sec. and 1 mc./sec. At the two lower frequencies studied, temperature rise within the spinal canal was approximately the same as temperature rise of subcutaneous tissue. "Selective" heating of nerve was especially evident at 490 kc./sec.

Careful and detailed studies of the absorption of ultrasonic energy by tissue samples in vitro, following exposure at varying frequencies, have been reported.[1] From these data, and from a knowledge of the physical properties of the tissues, the relative heating at various depths at different frequencies may be calculated. Unfortunately, predictions based on in vitro studies are not always fulfilled when the intact animal is examined. One example of such a discrepancy is the different pattern of temperature increase when infrared radiation is applied to tissue in vitro[2] from that achieved when it is applied to the normal human.[3] In the area of ultrasonics, differences have been noted between heating of bone in the isolated specimen[4] and in the intact living mammal.[5, 6] Such discrepancies may be simply quantitative. On occasion, however, qualitative differences appear, which necessitate a re-evaluation of basic theoretical mechanisms. These differences between the in vitro and in vivo situations may be due to the differences in circulation, to changes in hydration[7] on removing the tissue from the living organism, to the far more complex relationship between tissues in the living organism, and to other factors not yet recognized. Changes in hydration may have a considerable effect on the absorption of ultrasound by tissue.[7]

Because situations exist in which the in vitro experiment is not exactly duplicated in vivo, it was felt desirable to extend studies already performed in this area. The following experiments were therefore carried out, in the living mammal, to determine what the pattern of temperature rise might be at various frequencies of ultrasound in situations approaching those faced clinically. The primary depth of penetration of ultrasound has been calculated for the ideal state. It remains to be seen what the effective depth of penetration is in vivo, measured in terms of actual temperature rise.

Methods

All experiments were performed on dogs anesthetized with 35 mg. of pentobarbital sodium per kilogram of body weight, administered intravenously. Hair over the site to be sounded had previously been removed by clippers and shaving. Ultrasound generators (Alcar Instruments, Little Ferry, N. J.) operating at 490 kc./sec., 1 mc./sec., and 3 mc./sec. were used. The crystal area in all instances was 12.5 cm.^{2} Average energy output was measured with radiation pressure technics, while the distribution of energy was determined with a thermistor. An attempt was made to keep the intensity equal at all three frequencies, at either 1 watt/cm.^{2} or 1.5 watts/cm.^{2} A stationary technic was utilized, with continuous output, and a duration of sounding of 1 minute. Coupling between sound head and tissue was provided by mineral oil. Because of difficulties in measurement of exact intensity levels, and in exact placement of sound heads, all results were evaluated in terms of the ratio of temperature rise at a depth to temperature rise of subcutaneous tissue, rather than in terms of absolute temperature rises.

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This study was supported by a grant from the Curtiss-Wright Corporation, Caldwell, N. J.

Temperature recordings were made with copper constantan thermocouples and a Bristol 8-lead dynamaster potentiometer with 2/3 second full travel time. Temperatures could be recorded at each of eight sites approximately every 5 seconds. The thermocouples were placed in the region of maximal ultrasound field — as far as vertical distribution was concerned — using a technic described previously.[6]

In any one experiment temperature rises were recorded following sounding at each of the three frequencies studied. The order and sequence of the frequencies were randomized, and no study was begun until the temperature had returned to normal levels. Since there was a different transducer for each frequency, one had to try to duplicate as closely as possible the position of the sound heads during the sounding period. One further problem which arose due to the use of three different transducers was possible variation in pressure with which the transducer was applied to the skin. To minimize this factor, a 27-gage needle was placed adjacent to, but not in contact with, the subcutaneous thermocouple. At a given pressure due to the application of the transducer, the two needles would approximate and the resistance, recorded in a circuit which included an ohmmeter and the two needles, would fall to zero. This end point was sharp and could be used to keep the transducer contact with the skin approximately the same.

Four different groups of experiments were performed. In the first group (A), the lateral surface of the thigh was sounded at an intensity of 1 watt/cm.^{2}, and temperatures were recorded in the subcutaneous tissue, in muscle, and at the point of contact with the femur, which we call for convenience periosteal. In group B, the lateral surface of the knee joint was sounded at 1 watt/cm.^{2} Temperatures were recorded subcutaneously and intra-articularly.

In the third group of experiments (C), the vertebral column was sounded at the level of the 5th lumbar vertebra at an intensity of 1.5 watts/cm.^{2} The position of the conus medullaris, in the dog, is at the level of the 6th or 7th lumbar vertebra.

Subcutaneous temperature was taken as before. Periosteal temperature was taken on the dorsal aspect of the lamina of the 5th lumbar vertebra. A surface was mapped out by drawing two longitudinal lines, one through the spinous process and the other through the region of origin of the transverse process, and connecting these with lines running along the cranial and caudal aspects of the vertebra. The periosteal thermocouple was placed at approximately the middle of this surface. Intraspinal temperature was recorded by passing a thermocouple forward, just medial to the articular process, until the recording tip (as computed from the length of the thermocouple and its angle of entry) was at approximately the same plane as the periosteal couple. In several preparatory experiments carried out before actual recordings were made, sacrifice of the animal showed that the intraspinal needle was very close to the predicted position.

In group D, the posterior aspect of the thigh was sounded at an intensity of 1.5 watts/cm.^{2} Temperatures were recorded in the subcutaneous tissue, sciatic nerve, and posterior aspect of the femur (periosteal). The technic used for localizing the sciatic nerve has been described previously.[8] Briefly, this procedure consisted of determining the point of minimum threshold to a 1.5 millisecond square wave stimulus. Cutdown after completion of the experiment revealed that the thermocouple tip was in contact with the sciatic nerve.

Results

A. *Sounding of the Lateral Aspect of the Thigh (22 Experiments).* These studies were performed at an average room temperature of 28.7 C. The average initial temperatures in subcutaneous tissue, muscle (1.3 cm. depth), and periosteum (2.14 cm. depth) were 32.7 C., 35.4 C., and 37.5 C., respectively. Figure 1 shows the temperature rise at various depths, as related to the temperature rise of subcutaneous tissue, at the three frequencies studied. The differences be-

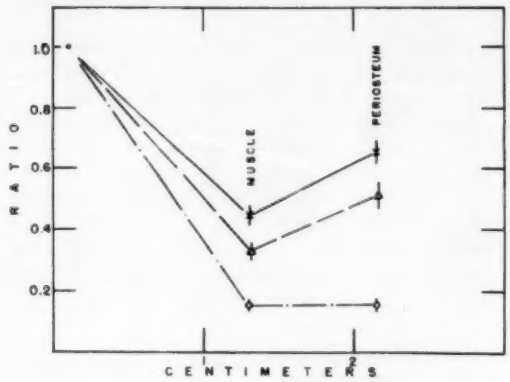

Fig. 1 — Temperature rise in muscle and periosteum following exposure to ultrasound at frequencies of 490 kc./sec. (crosses), 1 mc./sec. (triangles), and 3 mc./sec. (open circles). The ordinate refers to the ratio of temperature rise at a depth to temperature rise of subcutaneous tissue; the abscissa refers to depth from the surface. The vertical lines represent one standard error from the mean.

tween the relative temperature rise at the various frequencies were statistically significant. Furthermore, at 490 kc./sec. and 1 mc./sec., the periosteal temperature rise was significantly greater than the temperature rise in overlying muscle.

B. *Sounding of the Lateral Surface of the Knee Joint (12 Experiments).* The average room temperature was 28.8 C. The mean initial temperatures of subcutaneous tissue and knee joint (1.79 cm. depth) were 33.4 C. and 36.2 C., respectively. The ratios between intra-articular temperature rise and subcutaneous tissue temperature rise at 490 kc./sec., 1 mc./sec., and 3 mc./sec. were 0.56, 0.31, and 0.1, respectively. The differences were statistically significant ($p < 0.02$).

C. *Sounding of the Vertebral Column (12 Experiments).* The mean room temperature for these experiments was 27.7 C. The average control temperatures of subcutaneous tissue, periosteum (1.86 cm. depth), and spinal canal were 33.9 C., 37.4 C., and 37.7 C., respectively. As noted in figure 2, at 490 kc./sec. and at 1 mc./sec. the temperature rises at all three sites were approximately the same. The slightly higher temperature intraspinally following sounding at 490 kc./sec. was of no statistical significance ($p = 0.5$). With sounding at 3 mc./sec., however, the temperature increase declined very rapidly with depth from the surface.

D. *Sounding of the Posterior Aspect of the Thigh, Including the Sciatic Nerve (12 Experiments).* These experiments were performed at a mean room temperature of 27.8 C. The average initial temperatures of subcutaneous tissue, nerve (2.8 cm. depth), and periosteum (4.57 cm. depth) were 32.5 C., 36.9 C., and 37.1 C., respectively. The pattern of temperature rise may be noted in figure 3. The general anticipated decline in temperature increase with depth was approximated on exposure to ultrasound at 1 mc./sec. and 3 mc./sec. This was not, however, true at 490 kc./sec., and the temperature increase in the region of the sciatic nerve, at an average depth of 2.8 cm., was not significantly different from the increase of temperature in the subcutaneous tissue.

Discussion

At a given energy output by an oscillating crystal the rise of temperature at any point in the ultrasonic field depends upon many complex physical and physiological factors. Of major importance from the physical standpoint is the pattern of energy distribution which depends upon such factors as beam divergence (greater at lower fre-

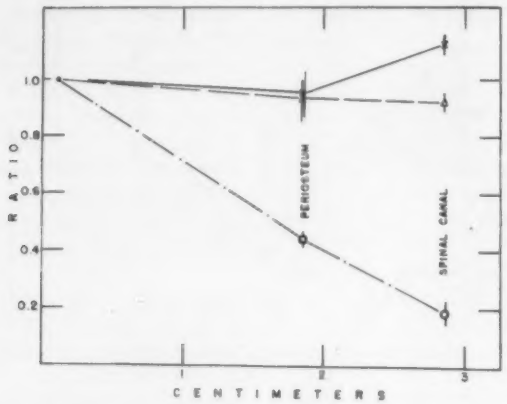

Fig. 2 — Temperature rise in periosteum and spinal canal following exposure to ultrasound at frequencies of 490 kc./sec. (crosses), 1 mc./sec. (triangles), and 3 mc./sec. (open circles). The ordinate refers to the ratio of temperature rise at a depth to temperature rise of subcutaneous tissue; the abscissa refers to depth from the surface. The vertical lines represent one standard error from the mean.

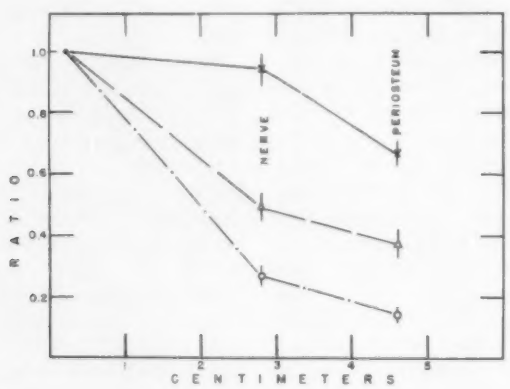

Fig. 3 — Temperature rise near the sciatic nerve and in periosteum following exposure to ultrasound at frequencies of 490 kc./sec. (crosses), 1 mc./sec. (triangles), and 3 mc./sec. (open circles). The ordinate refers to the ratio of temperature rise at a depth to temperature rise of subcutaneous tissue; the abscissa refers to depth from the surface. The vertical lines represent one standard error from the mean.

quencies), standing waves (probably of minimal importance), and interference patterns. One must also take into consideration reflection at regions with changes in acoustic impedance, structural heating, acoustic absorption coefficients, specific heat of the tissue, and rate of removal of heat. The removal of heat may be analyzed further from physical and physiological standpoints. Physical factors, mainly measured by thermal conductivity of the tissue, can be measured fairly accurately by in vitro studies. Physiological factors responsible for removal of heat are essentially those concerned with local circulation, and can be approached for study only in the living organism.

It is in the latter area that one runs into the biggest — but not the only — stumbling block in attempting to predict in vivo temperature rise on exposure to ultrasound, as used clinically, from information obtained by in vitro studies. Bone, for example, as far as can be determined, has an extremely low blood

flow in comparison with muscle, and can remove heat very poorly through this process. Muscle, a tissue which can remove heat efficiently through circulatory mechanisms in the living state, dissipates heat inefficiently when circulation ceases. An additional factor creating difficulty in the intact living organism is the relatively more complex surface relationship between tissues in this state as compared with the usual configuration in in vitro studies.

This study was not designed to reveal any new fundamental properties of ultrasound, but merely to investigate what rise of temperature might be produced in a situation resembling that of clinical use of ultrasound. As was anticipated, and as was apparent in all situations tested, the effective depth of penetration of ultrasound at a frequency of 3 mc./sec. was not great, being only slightly greater than that of infrared radiation.[3]

When a sufficient amount of energy reached bone, the temperature rise was greater at the bone surface than in overlying muscle. This was true predominantly in the situations in which bone was relatively superficial. This is in accord with previous studies in the intact animal,[5, 6] and probably reflects not only the physical discontinuity, but also the inability of bone to dissipate heat rapidly enough through convective mechanisms. Lehmann[9] also has shown that at low ultrasound intensities selective heating seems to disappear.

Of some surprise was the relatively efficient heating within the spinal canal at a depth of approximately 3 cm., on exposure to ultrasound at frequencies of 490 kc./sec. and 1 mc./sec. Whether this represents a complex pattern of reflection from a highly irregular bone surface, direct penetration of ultrasound through a relatively thin bony plate, or secondary conduction from heated bone, cannot be stated because definite evidence was not provided by these experiments. Although the human spinal cord is much deeper, the possibility of temperature rise should be considered when ultrasound is applied therapeutically to this area.

Selective heating of nerve in the ultrasound field has been postulated as a mechanism for explaining some of the effects of ultrasound on excitability.[10] From this study it was suggested that at 1 mc./sec. and 3 mc./sec. the temperature rise close to the sciatic nerve was slightly greater than one might expect at that depth. This "selective" heating effect, however, was marked and significant at 490 kc./sec. In experiments previously carried out at 175 kc./sec. and 1 mc./sec., interface heating was more marked at higher frequencies than at lower ones.[11] From those studies one would have predicted a lesser "selective" effect on nerve at 490 kc./sec. than at the higher frequencies. Again definitive evidence is not available to explain the results obtained. We may be dealing with irregularities due to the interference field. Or, on the other hand, this may be a manifestation of a phenomenon which is enhanced at lower frequencies — namely, cavitation. At the intensity used, cavitation has been demonstrated in vivo, under certain special circumstances.[12] Of interest from this standpoint is the observation that bubbles appear in myelin sheath on decompression from a pressure of 6 atmospheres,[13] whereas such bubbles do not appear in muscle tissue. This may suggest that cavitation is more likely to occur in nerve than in muscle.

Summary

Various areas of the anesthetized dog were sounded at frequencies of 490 kc./sec., 1 mc./sec., and 3 mc./sec., and temperatures were recorded in different tissues. In all situations tested, the effective depth of penetration at 3 mc./sec. was not great, as measured by temperature rise. With relatively superficial bone, the temperature rise at the bone surface was greater than that of overlying muscle when sounding was done at frequencies of 490 kc./sec. and 1 mc./sec. At the two lower frequencies studied, temperature rise within the spinal canal was approximately the same as temperature rise of subcutaneous tissue. "Selective" heating of nerve was especially evident at 490 kc./sec.

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Our Task is Clear

Until "old" is an honor and
old age a reward,
Until old age at the very least
receives for its contributions
its due in recognition or return,
Until old age is accorded in our society
at least the courtesy of equal opportunity,
There is work to be done.

— SENATOR THOMAS C. DESMOND, CHAIRMAN
New York State Joint Legislative Committee
on Problems of the Aging

Iontophoresis Studies With a Radioactive Tracer

Harry T. Zankel, M.D.
Robert H. Cross, M.D.
and
Henry Kamin, Ph.D.
Durham, N. C.

● This is a report on a program of research to determine the amount of radioactive substance absorbed during iontophoresis. This work deals with ion transfer studies using radioactive iodine, with and without the application of heat and other modalities. Measurements are reported for skin absorption, and skin transmission as evidenced by tracer studies in 24 hour urine samples.

This is the first of a series of iontophoresis studies in man in which a radioactive tracer was used. The object of these studies is to ascertain: (1) the proportion of drug absorbed through the skin into the circulation, as manifested through its recovery from urine under conditions where all of the drug absorbed is excreted; (2) the proportion retained in skin, and the kinetics of its disappearance; (3) the distribution in various layers of skin, and the depth of penetration. The present report deals primarily with the proportion of drug absorbed into the circulation and excreted in the urine.

Iontophoresis studies in which a radioactive tracer was used have previously been reported for experimental animals. O'Malley and Oester[1] reviewed the literature on iontophoresis and gave a fairly complete bibliography. These authors, using iontophoresis in the rat, demonstrated that the distribution of P^{32} in the tissues is proportional to the current density, length of treatment, and concentration of ions. They also used albumin labeled with I^{131} and found that it was not readily transported to the tissues. In view of the polyvalency of phosphate and albumin, it was felt that a quantitative study with a monovalent ion, was a charge that was invariant with pH, would be of value.

I^{131}, as iodide ion, was used in these studies because of its ready availability, its favorable half-life (8 days), and the vast body of information which has accumulated concerning its metabolism. Previous saturation of the subject's thyroid with nonisotopic iodide may be expected to lead to nearly quantitative excretion of absorbed radioactive iodide, and thus permit the use of urinary excretion as a measure of iodide absorption.

Methods of Study

The subjects used were patients on the physical medicine and rehabilitation bed service, since their length of stay was sufficient to permit repeat studies where indicated. So far as could be ascertained, none of the subjects suffered from thyroid or renal disease. Prior to administration of I^{131} each patient was given 20 drops of a saturated solution of potassium iodide in orange juice. The patient then received the indicated treatment, and the distribution of radioactive material was then evaluated. Routinely, radioactivity was measured, with appropriate standards and decay corrections, in the electrode pad, on the skin, and in 24- and 48-hour urines. In no case was radioactivity above body background detected in the area of the thyroid. Scintillation counting technics were used throughout.

Administration of Drug. The patient was placed in the supine position. A circular pad of asbestos paper (1 inch radius, 3.14 square inches surface area, and 1/16 inch thick) was placed over each anterior thigh. One cubic centimeter of I^{131} solution containing 4μ, was carefully distributed over one of the pads, followed by 1 cc. of saline; the other pad was saturated with 2 cc. of saline. A smaller, thin copper electrode was placed over each pad, and over this, a circular

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piece of cellophane large enough to cover the entire pad and electrode. A firm rubber strap around the thigh held the cellophane, electrode, and pad in place. The copper electrode over the iodide-saturated pad was connected to the negative pole of a galvanic generator, and the other electrode to the positive pole. The current was turned on and gradually increased to 3 ma., in accordance with the principle of galvanic treatment which calls for not more than 1 ma. per square inch of lesser electrode.

None of the patients found this technic annoying, except one who sustained a slight galvanic burn through improper technic, in that the edge of the copper was allowed to press against the skin. After the treatment, usually of 30 minutes' duration, the pad and electrode and cellophane from the iodide-treated area were carefully removed and placed in a 2-inch diameter paper cup for counting. The skin was dried with a gauze sponge, and the sponge was placed in the same paper cup.

Counting Technic. After the indicated treatment, residual activity on the electrode pad, electrode, cellophane, and skin-drying gauze was counted in the paper cup placed on ¼ inch lead over the crystal of the Nuclear Model DS-3 Scintillation Radiation detector, and counted in the Model 183B Scaler in conjunction with the Model 1810 Radiation Analyzer. An aliquot of the I^{131} treatment solution, applied to a similar asbestos electrode pad and also counted in a paper cup, was used as a standard; precautions were taken to insure identical geometry for standard and unknown.

For assay of the urine, a 3 ml. aliquot of the 24- or 48-hour urine was counted in a 1 dram (about 4 ml.) vial within the well of the Model DS-3 Radiation Detector, against a dilution of the original treatment solution used as a standard and counted in a similar vial. This counting technic permitted expression of results in terms of percentage of the original dose retained in the electrode, and appearing in the urine.

For skin counting, the skin was swabbed with dry gauze to remove any superficially adherent I^{131}, covered with thin cellophane, and counted in direct contact with an uncollimated Nuclear Model DS-1 Scintillation detector. The detector was connected to a Nuclear Model 1615B Precision Rate Meter and Esterline-Angus recorder, and the counting rate was read from the recorder. Backgrounds were obtained by similar counting of the untreated thigh, and standards were counted by applying a small aliquot of the dose solution to an untreated 2-inch diameter skin area, air-drying the solution, and counting in a manner similar to that used for the treated area. This counting technic, due to the unavoidable problems of whole-body counting, does not yield data of the precision obtainable with the other samples, but is considered to be the best available compromise between convenience and precision.

Results

The present studies measured the urinary excretion of I^{131} following the application of radioactive iodine to the skin under four sets of conditions: (1) without any treatment, (2) following 30 minutes of heat with a 300-watt infrared lamp, (3) 30 minutes of heat preceding 30 minutes of iontophoresis, and (4) 30 minutes of iontophoresis alone. The data from these studies are indicated in table 1.

I^{131} Appearance in Urine. From the data in table 1, it can be seen that significant amounts of radioactivity appear in urine only under those conditions which include iontophoresis. The urine radioactivity after iontophoresis, with and without heat treatment, differs significantly ($p = < .01$) from that found after simple application of I^{131} to skin, with or without heat. Urine radioactivity after iontophoresis with heat does not differ significantly from radioactivity after iontophoresis without heat ($p = > .1 < .2$). In the absence of iontophoresis, the figures with and without heat, when calculated, are significantly different from each other ($p = < .02$); however, since under each of these conditions the total amount excreted is trivial, little weight is attached to this finding.

Table 1: Data from Iontophoresis Study with a Radioactive Tracer

Treatment	No. Patients	Per Cent of Radioactivity					
		In Skin†	Pad plus Electrode	Urine			Total*
				Average	± S.D.	Range	
Iontophoresis	24	3.7	86.2	5.56	3.25	1.5 -12.5	91.7
Heat plus iontophoresis	13	4.5	88.6	7.21	2.71	2.4 -11.7	91.9
No heat, no current	12	1.4	97.6	0.26	0.32	0.01- 0.98	98.0
Heat alone	14	0.83	98.8	0.04	0.04	0 - 0.12	99.0

*This column represents the sum of radioactivity in urine, pad, and electrode. Skin radioactivity was not included, since much of it will appear in 24-hour urine.
†Not all patients were counted.

In addition to the treatments indicated in table 1, three patients were given hydrocollator pack treatment for 30 minutes over the radioactive iodine pad plus electrode. Average iodine excretion was 3.3 per cent; with the same treatment but without current, 0.09 per cent was excreted.

Radioactivity in Skin. As seen from table 1, detectable amounts of I^{131} appear in the skin after application of this isotope. The data listed represent iodine not removable by dry sponging, and only a small additional portion can be removed by washing with soap and water. Iontophoresis appears to increase the amount of isotope found in skin. In several patients, the rate of disappearance of I^{131} from skin was determined. The disappearance, after iontophoresis, seems to consist of two phases: an initial rapid disappearance, at the rate of 12 per cent per 10 minutes for about one hour, followed by a slow phase at the rate of 2.5 per cent per hour. A typical disappearance curve, in a semilogarithmic plot, is shown in figure 1. These two types of disappearance may represent deposition of iodine in tissues of varying vascularity; it is also possible that part of the isotope may be present in chemical combination with tissue components.

Residual Radioactivity in Pad and Electrode. After it is administered for treatment, the bulk of I^{131} remains in the electrode, as seen in the data in table 1. After iontophoresis, less iodine is found in the pad and electrode than can be accounted for on the basis of iodine in skin and urine. This discrepancy has not been accounted for; no I^{131} appears in the thyroid, and I^{131} excretion during a 24- to 48-hour period does not resolve this discrepancy. Since an iodine standard applied superficially to skin may not adequately represent iodine absorbed into deeper tissue layers, the possibility exists that the discrepancy noted may be a result of the difficulties inherent in skin counting.

Discussion

In these studies, attempts have been made to measure the absorption of a negative ion, I^{131} as iodide ion, through unbroken skin under a variety of conditions. Of the conditions tried, only those which included iontophoresis resulted in the absorption of appreciable amounts: 3 to 10 per cent of the applied dose; pretreatment of the affected area with heat from an infrared lamp had no effect upon the iodine absorbed during iontophoresis. In the absence of current, with or without applied heat, the amounts of iodine absorbed were trivial.

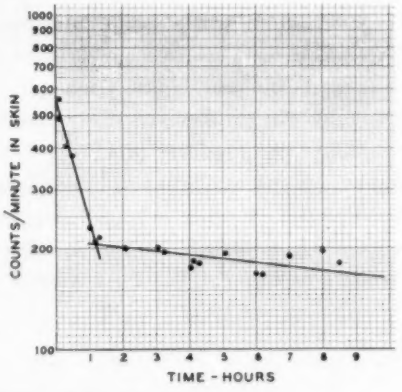

Fig. 1 — I^{131} disappearance from skin after iontophoresis.

The present technic does not indicate the location of the I^{131} which is present in the skin after iontophoresis. The biphasic nature of the disappearance curve, as well as the failure to account for 100 per cent of the iodine administered, suggests that the distribution in skin is not a simple one. Further studies are contemplated for studying skin distribution under varying sets of conditions.

Summary and Conclusions

Studies have been performed, using radioactive iodine as iodide ion and a galvanic current, to determine the amount of iodine absorption through the skin and into the circulation, as manifested by its recovery from the urine. Iodine was applied to the skin for 30 minutes, with and without heat, moist packs, and iontophoresis. With iontophoresis, about 6 per cent of the iodine applied was absorbed; pretreatment with heat did not significantly alter this figure. In the absence of current, with or without heat, less than 0.25 per cent was absorbed. These studies are continuing.

Reference

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Have you heard . . .

For the first time the World Congress of the International Society for the Welfare of Cripples will convene outside the limits of continental Europe. Immediately following the 3rd International Congress of Physical Medicine to be held at The Mayflower, Washington, D. C., the week of August 21, 1960, The National Society for Crippled Children and Adults, integrating its own annual meeting with the 8th World Congress will host and organize the week-long session to commence on August 29, 1960 at the Waldorf Astoria, New York City. Doctor Howard A. Rusk, Director of the Department of Physical Medicine and Rehabilitation at New York University-Bellevue Medical Center, has been elected President of the 8th World Congress. Doctor Rusk, currently president of the World Rehabilitation fund and immediate past-president of ISWC, will lead the international exchange of latest knowledge and technics contributing toward rehabilitation of the world's physically handicapped. Further information concerning the 1960 World Congress can be obtained from Donald V. Wilson, secretary general, International Society for the Welfare of Cripples, 701 First Avenue, New York 17, N. Y.

Role of Personality Traits in Rehabilitation Problems

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● In psychiatry, the development of personality traits as defenses against anxiety is widely accepted. In rehabilitation, personality traits often interfere with motor learning and create serious problems. This paper cites cases to show how personality traits interfere with motor learning; suggests a mechanism to explain the interference, and indicates management of the problem. Concrete methods for increasing the patient's reception of information during the task performance and reducing the interfering sensory-motor effects of the personality traits are discussed. Personality traits become a rehabilitation problem when they produce cortical effects which interfere with the progressive cortical reorganization that characterizes motor learning.

It is widely recognized that personality traits sometimes produce serious problems in rehabilitation of the physically handicapped. Usually, the psychiatrist is called upon to investigate these problems. As yet, it must be acknowledged, the psychiatrist has been considerably less than fully effective in helping the rehabilitation team manage these problems in motor learning.

This failing is largely ascribable to the fact that the psychiatrist deals with personality in terms that have little significance for the physiatrist in his daily, very concrete work. When told, for example, that the patient's problem in learning the rehabilitation task is caused by dependency, narcissism, masochism, or unconscious hostility, the physiatrist can only shrug his shoulders helplessly and cede to the reluctant psychiatrist the management of these problems.

New hope for fruitful cooperation between these medical disciplines is opened up when the relationship of personality traits to rehabilitation problems is approached more concretely. By defining a personality trait as a characteristic mode of reacting to stress, the following question may be posed: How does the patient's characteristic way of reacting to stress affect adversely the process of motor learning in rehabilitation?

Definitions and Hypothesis

At the outset a few definitions and a statement of the hypothesis to be presented are in order.

By motor learning is meant the development of more and more effective action through a series of progressive, cortical rearrangements. An effective action is one that attains its goal. For learning to be effective it is obvious that the following cerebral processes must occur: (1) reception of essential information from both inside and outside the organism, (2) analysis of the information and comparison of it with both the goal and previous experiences of a similar kind, and (3) organization of new patterns of neuronal arrangement, based on this new information, to produce a more effective action.

Psychiatrists regard personality traits as automatic "defenses" against anxiety and as "ego defenses." We may safely assume that each personality trait is associated in the brain with its own particular "nervous arrangement" — a figure of speech borrowed from John Hughlings Jackson.[1] The hypothesis presented here is that a personality trait creates a problem in rehabilitation to the extent that its cerebral nervous arrangement interferes with the cerebral processes that are essential for effective motor learning.

Case Material

In studying the relationship of personality traits and rehabilitation problems, I have found it necessary to extend the psychiatric examination so that, in addition to the psychiatric interview, it includes direct observation of the patient engaged in the rehabilitation task. Ten cases will be presented to illustrate how personality traits blocked learning and how they were approached therapeutically.

Case 1. A 50-year-old man with posttraumatic hysteria would hyperextend his body in an involuntary defensive reaction to a host of situations that were stressful

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for him. When he tried to walk, for example, the stereotyped hysterical reaction would throw him dangerously off balance and he would grab for some external support. At that point a new defensive reaction developed: He smiled and chattered incessantly — minimizing his obviously grave difficulties — and ascribed his bizarre reaction to "a little stiffness" in his back. His heart beat rapidly, he perspired profusely, and his voice and body trembled as he talked — but he was unable, at that moment, to acknowledge that he was disturbed or that he had almost fallen. This type of defensive reaction in the hysteric we refer to as "belle indifference."

After two years on the rehabilitation program, he was felt to be hopeless by most of the physicians and therapists. He could not leave the security of his walker without going to pieces. The staff believed that the patient "really didn't want to get well" and resented his bland manner and self-assuredness in the presence of repeated failure.

Comment: The patient's characteristic reactions to stress interfered with learning in three ways: (1) the rearing-backwards reaction conflicted with his efforts to walk, threw him gravely off balance, and forced him to stop lest he fall; (2) the "belle indifference" reaction interfered with his ability to perceive the state of his organism internally and blocked the cerebral processes associated with effective learning — that is, while talking to reassure himself and the therapist, he could not attend to the task at hand; (3) the therapists misunderstood what was going on in the patient, and because of their incorrect assumptions, they actually stopped trying to find new and better ways of helping the patient struggle with his very formidable problem.

The therapeutic approach consisted of the following: The patient was told to anticipate that whether he liked it or not, he would rear backwards at times as he attempted the prescribed tasks. He was asked to try, again and again, to control this movement sufficiently to maintain his balance. Supported and encouraged by the therapist in this new effort, the patient made a tremendous struggle to keep his balance while trying to walk, and slowly learned.

The "belle indifference" interference was successfully overcome by directing and pressing the patient toward the task despite his tendency to ignore his difficulties. We may presume that the resulting awareness of what he was doing made available to him new facts essential for effective learning.

He has made slow but very impressive progress in his ambulation program. His gait remains stiff and jerky at times, due to his abortive defensive motor reaction, but he is walking with a quadripod cane in the gymnasium and with two quadripod canes in his ward, which far exceeds what our expectations were a year ago. Further progress can reasonably be expected.

Case 2. A 52-year-old man recovering from hemiplegia on the left side had a psychotic, paranoid personality related to a schizophrenic process. He was learning very little in the rehabilitation program. He was extremely antagonistic to others, emitting a torrent of abuse and accusation whenever the staff asked him to try a new task or criticized his performance. He was unable to examine his own behavior. Some of the attendants and therapists hated him for his unjustified attacks on them and wanted to have as little to do with him as possible.

Comment: In this case, learning was interfered with because: (1) the patient's intense paranoid behavior blocked out information related to the prescribed task, and (2) his attacks antagonized the therapists so that they made little effort to help him beyond the barest minimum.

This problem was managed by helping the therapists recognize that the patient could not stop his paranoid reaction. They were urged to press him toward the task even if he was berating them. The patient was given approval for any effort in the prescribed direction and encouraged particularly for any nascent effective action. With this approach the patient made astounding progress. Within six weeks he had left the hospital, walking unaided. Apparently he had unusually good equipment

for learning, and when the interference of the paranoid reaction was overcome, learning proceeded uninhibitedly.

Case 3. A 49-year-old chronic alcoholic derelict was recovering from a serious hip fracture, sustained by falling. His characteristic way of dealing with stress was to plunge forward impulsively in action and not think about the problem. He did well in his ambulation program until he got to the level of the unipod cane. He then felt unsteady, developed a severe headache, and thought he was going to have a "stroke." He tried to plunge forward in his stereotyped fashion but became terribly shaky and felt he was going to fall and break his hip again. He became panicky and his progress came to a halt.

The therapists felt that the patient was faking his difficulties. They reasoned that he was now faced with the prospect of leaving the hospital, and since he had no home, "he didn't really want to get well and leave the hospital."

Comment: The personality trait of impulsively moving into a problem rather than stopping and thinking about it worked well until he got to a point in his program where a more exacting degree of muscular control was demanded than he could muster impulsively. He then became very unsteady. It is likely that he was then caught in a conflict between his impulse to drive forward and his tendency to go more slowly or to withdraw. The antagonistic effects of these conflicting reactions on the muscles of his body became manifest as a gross tremor that caused him to shake literally from head to foot.

In this case, much as in Case 1, effective learning was disrupted by: (1) the impulsive action interfering with the cerebral processes necessary for learning, (2) the conflicting motor reactions resulting in grossly ineffective performance, stress, and panic, and (3) antagonizing the therapists who wanted to have as little to do with him as possible.

Management of this case turned out to be unexpectedly simple. After witnessing his performance and interviewing him in the gymnasium, the psychiatrist reassured the patient that his headache did not signify an imminent "stroke" and that his tremor was probably the result of conflicting motor tendencies. The patient expressed appreciation for the interest shown in him. In a few days he was walking without a noticeable tremor, using a one-pronged cane. Within a month he had left the hospital.

We may presume that, after the interview, the patient was able to try again in his own way, no longer burdened by his fear of a "stroke" or disturbed by his tremor. Under these new conditions, he was capable of learning enough from his impulsive efforts to progress rapidly. One must recognize that learning here took place without there being any time to develop insight. Support against his own fears reduced his stress enough for him to learn the required action.

Cases 4-10 are in abbreviated form.

Case 4. A 7-year-old cerebral palsy girl had moderate spastic paresis of her lower limbs and very slight spastic weakness of her hands. She was able to speak unusually clearly and effectively for her age.

In the schoolroom her teachers regarded her as "angelic" and "delightful" and unusually capable. Most of the attendants and nursing staff regarded her as a "fresh, spoiled brat." When she was asked to do something that she didn't care to do, she would have a violent temper tantrum, throw her body and head about, and bite, kick, and scratch those near her.

The patient was asked to take off her socks, which she refused to do. As the request was firmly introduced again, she began to kick and yell, throw her head and body back on the bed, and toss from side to side. She shouted, "I can't — I don't want to — I can't." It was observed that as she yelled, she kept trying, most ineffectively, to manipulate her sock. The loss of control of her fingers and hands was far greater than anything she exhibited when she was not upset.

Comment: The patient's defensive crying and tossing about interfered with her ability to coordinate her hand muscles. The therapist let her cry while continuing to call for effort. She began to be more successful despite her crying. Her small

advances were pointed out approvingly. She soon was crying less and less while her coordination improved more and more. She was clearly mastering the problem when she was taken out of the hospital by her parents for personal reasons.

Case 5. A 13-year-old cerebral palsy boy would say, "I'm no good — I'm stupid," and weep pitifully when presented with an arithmetic problem. He would throw his pencil down after a few minutes and say, "I can't — I want to die." Although he was beyond his age in his use of language, he remained at the second grade level in arithmetic.

Comment: A new teacher came in and by utilizing patience and firmness and by giving support and maintaining belief in his ability to learn, she helped the patient advance from second grade to eighth grade arithmetic within a year. He was able to learn when favorable therapeutic conditions overcame the effects of his reactions to frustration.

Case 6. A bright 16-year-old cerebral palsy boy had difficulty in using his hands when he got upset. His fingers then moved more slowly and with less control. In school he balked at doing written arithmetic and preferred doing the problems in his head. He was regarded as obstinate and oppositional by the teacher.

Comment: In this case his reaction to anticipated motor difficulty was to be negativistic and to shift to the mental operation where he had more facility. It is clear that he couldn't learn written arithmetic as long as he moved away from his problem automatically. Unfortunately this problem was never dealt with. Other difficulties were more pressing.

Case 7. A 70-year-old woman with hemiplegia on the left side was unable to move her lower limbs as requested. Instead of taking a short step with her left leg and a long one with her right, she did the opposite, no matter how hard she tried. She kept making the effort but kept failing. She felt discouraged and anticipated that the therapist would give up with her and that she would never walk again.

This pessimistic reaction to her difficulty continued despite an outer cheerfulness. The therapist did lose confidence in the patient's interest in getting well and showed no enthusiasm with the patient. Soon the patient developed a severe backache and had to be taken off the program.

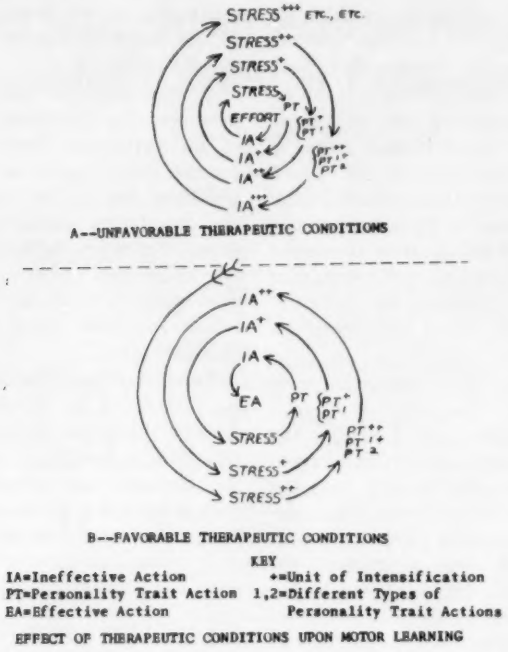
Comment: We may presume that the patient was so taken up with her almost certain expectation of failing that she was not observing the problem but was watching the therapist. She learned little. As her feelings of hopelessness increased, it became more and more of a strain to go on. In this setting her back pain arose and took her out of the learning situation.

Case 8. A 44-year-old woman had a degenerative disease of her spinal cord of unknown origin. The muscles of her right lower extremity became so weak that a short leg brace was suggested. Her response to this advice was to refuse to follow instructions. At home she put on high heels and admired herself in the mirror without awareness at that moment of her infirmity.

Comment: The patient's reaction to the frightening prospect of an overt indication that she was crippled was to refuse to wear the sign of her infirmity and to deny her difficulty. When pressured to put on the brace, she became very depressed. She was then given a great deal more attention, support, and encouragement for her effort during the trying period of accommodation. She slowly learned to walk with the brace. As her ambulation improved, she lost her depression and no longer denied her handicap.

Case 9. A 68-year-old woman with hemiplegia on the left side was asked to change the direction of the shuttle's entry in the loom and was unable to do so. No matter how hard she tried, she could not succeed. The therapist told her not to be so perfectionistic. The patient became panicky, felt she was losing her mind, became nauseated, and decided to quit. She wanted to die — to kill herself.

Comment: The patient was known as "Fussy Ophelia" and called an "eager beaver" because of her exaggerated



EFFECT OF THERAPEUTIC CONDITIONS UPON MOTOR LEARNING

tendency to do everything just right and to avoid failure. The therapist's effort to get her to stop being perfectionistic just panicked the patient all the more. She was not able to learn the required actions until the therapist acknowledged that the patient could not help being upset and depressed. The therapist just asked her to keep trying in her own way and gave approval for the slightest indication of improved performance. Then the patient returned to the task and quickly was able to regain her former efficiency under the new conditions.

Case 10. A 10-year-old cerebral palsy boy would begin to smile and talk about other things in an engaging, plaintive, sing-song fashion while trying to ambulate with crutches.

Comment: He made little progress in his ambulation program until the therapist learned not to be distracted by his sympathy-evoking manner and just directed him back to the task, asking for effort — smile or no smile. Learning then proceeded satisfactorily as the necessary information became available.

Discussion

Findings. These case studies suggest that, where there is a rehabilitation problem, effective learning is influenced adversely by the patient's characteristic way of reacting to stress in one or all of the following ways:

1. By inhibiting the cerebral processes necessary for effective learning. It seems likely that strong excitation of the neuronal arrangement characteristic of the defensive reaction may induce this inhibition and results in failure to learn.

2. By producing defensive motor actions which oppose and interfere with the task-action being learned. As a result of the motor conflict, the task-action becomes grossly ineffective resulting in increased stress, new or more intensified defensive actions, even more ineffective action, and so on. A chain reaction is thus set up which ends in a state of panic and disorganization incompatible with effective learning (see accompanying diagram).

3. By influencing the therapist adversely. This is of prime importance because the therapist's active, helpful

participation is absolutely essential for effective learning once a serious problem in rehabilitation has developed.

Mechanism. While other interpretations and conceptions are of course possible, I have found it most useful to visualize the mechanisms by which personality traits result in a rehabilitation problem as shown in the accompanying diagram. The result then of continued effort under unfavorable conditions (part A of diagram) is increasingly ineffective action, increasing stress, and increasing inability to learn.

Management. We cannot hope to stop the patient from reacting to stress in his characteristic way. Neither the patient's will nor our most fervent exhortation can dissolve the countless numbers of nervous connections, developed from countless experiences over the years, that now determine the personality trait. Therefore we try to find ways of reducing the states of stress that evoke the personality traits. In this way we are able to reduce the frequency and the intensity of the defensive reactions and so minimize the adverse effects of the patient's personality traits upon the rehabilitation situation.

Stress reactions in rehabilitation tasks are favorably influenced by:

1. Assuring the patient that we understand that he is unable by himself to stop the personality trait from arising. This permits the patient to be under less stress in the therapist's presence when these effects develop.

2. Directing the patient toward effort as the immediate goal rather than success. Whatever the patient does then is praiseworthy to some degree, merely because he tried. Stress is thereby reduced and the patient encouraged to make additional efforts. From the efforts eventually emerge small successes which are carefully nurtured by the therapist.

3. Directing the patient to concentrate on the prescribed task despite the interfering personality trait. Temporarily this may appear to increase his stress, but soon what the patient learns by concentrating on the problem permits him to act more effectively, and then the stress is reduced.

4. Directing the patient to try to overcome the interfering motor aspects of his personality traits. At first the patient may appear to be even more unstable, but as he learns to control the interfering motor aspects of his personality traits, he begins to act more effectively and stress is reduced. This then starts a constructive chain reaction which facilitates learning (see part B of diagram).

Conditions for reducing stress can only be introduced by a therapist. Consequently, when the therapist's efforts are thwarted by interfering personality traits, the therapist can remain constructive only if he has a good understanding of the patient's problems in learning.

Conclusion

These cases suggest that patients can learn to act effectively despite the severe limitations and handicaps imposed by some personality traits. Therefore, it is not usually necessary to seek to eliminate an obstructing personality trait in order to successfully manage a rehabilitation problem.

The psychiatrist serves his function best as consultant by helping the physiatrist discover, understand, and manage the blocks to motor learning introduced by the patient's defense reactions. This requires direct involvement by the psychiatrist in the rehabilitation situation itself. It likewise demands participation by the physiatrist in the analysis and resolution of the problems in rehabilitation related to the patient's personality. The position advanced here does not negate the value of traditional psychotherapy, but it may call for a more precise explanation of how such psychotherapy works — when it does — to promote motor learning.

Reference

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Oral Intermittent Positive Pressure Breathing (OIPPB) in Poliomyelitis

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• A new manner of artificial ventilation is described in which filtered air is intermittently pumped to the patient's mouth using a hose and pipestem mouthpiece. This has several advantages over conventional methods of mechanical artificial ventilation for the convalescent poliomyelitis patient e.g., self-regulation of tidal volume, partial self-regulation of rate, improved accessibility for nursing care, freedom from shell and tank encumbrances, less hindrance to standing and walking, and preservation of rib cage mobility through maintenance of normal respiratory excursions. Thus, OIPPB has proved useful for both artificial ventilation and physical therapy. As with other positive pressure methods, OIPPB may affect the peripheral circulation by elevating intrapleural, right atrial and systemic venous pressure. The over-all advantages of OIPPB have been demonstrated in 34 poliomyelitis patients requiring respiratory assistance; two case reports are given.

During the past decade epidemics of poliomyelitis left large numbers of patients confined to tank respirators. These patients could not be rehabilitated unless they could somehow be weaned from their respirators. Other respiratory aids existed but they were not adequate or simple enough to permit this step.

Although cuirass or chest respirators were introduced in the 1920's,[1] the rocking bed provided the first freedom from the tank respirator. Then the cuirass was improved and reintroduced, opening an era of rapid improvement of respiratory aids. A rich variety of respirators and pumps appeared, each offering special advantages for the patient previously in "solitary confinement." The next step was the introduction of positive pressure applied either through a mask or tracheotomy tube.

Special efforts have been made in this center to apply intermittent positive pressure breathing (IPPB) directly to the mouth by means of a hose and pipestem mouthpiece to allow maximal freedom from encumbrances. This new method of oral intermittent positive pressure breathing (OIPPB) permits self-selection of tidal volume by the patient and offers other advantages over previously established methods. Fifty-three poliomyelitis patients admitted to this center requiring respiratory assistance have tried OIPPB. The results are reported in this paper.

History of OIPPB

The earliest record of positive pressure breathing is the biblical account of the revival of a child by Elisha who presumably used mouth-to-mouth breathing. Paracelsus in 1530 used a fireplace bellows for artificial respiration of unconscious or apneic patients.

Bennett's accessory attachment to the tank respirator, in use since 1948, provides positive pressure for administration via a mask or tracheotomy tube.[2] In 1948, the Council of Physical Medicine of the American Medical Association in reporting on the MSA pneophore, an apparatus for administering oxygen by intermittent positive pressure (IPP), asserted that this valve could be used for treatment of respiratory failure in poliomyelitis for one hour or less.[3] Motley and others[4] evaluated several types of IPP devices for administering artificial respiration through a mask and referred to a hand bellows that had the desirable feature of a safety valve, as described by Kreiselman in 1943.[5]

During the 1948 epidemic in North Carolina, Masland and associates,[6] by means of a mask and a mine safety appliance valve, administered IPP to poliomyelitis patients who had no tracheostomy. By this means they accomplished two purposes: (1) artificial ventilation of the patient when the tank respirator was opened; (2) treatment or prevention of pulmonary edema. Baumeister[7] administered IPP to poliomyelitis patients

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through a tracheotomy tube. Bang[8] of Denmark administered IPP with simple, inexpensive equipment and maintained a closed system. More recently the anesthetists' bag has provided an outstanding example of the application of IPP directly to the airways. This method was adapted for poliomyelitis patients by Lassen, Ibsen and their associates[9, 10] during the epidemic in Copenhagen in 1952, as an emergency measure when respiratory equipment was scarce. They instituted a high tracheostomy, inserted a soft rubber tube with inflatable cuff in order to secure a closed system, and pumped air or mixtures of oxygen and nitrogen into the lungs. Hand pumping was used in this emergency, although mechanical pumps had been described and extensively used during thoracic surgery in Sweden and Denmark.[11, 12] The Engström respirator developed in Sweden is currently in use, especially in northern Europe, along with others.[13-15]

In America, Mörch and his associates[16] omitted the cuff and showed that an open system is feasible, provided sufficient humidified airflow is supplied to compensate for the leak about the tracheotomy tube. This open method has further advantages. The standard metal tube with its larger lumen offers less resistance than a relatively thick-walled rubber tube, the danger of gradual deflation of the cuff is obviated, and trauma to the tracheal mucosa is lessened.

The use of oral positive pressure by the convalescing poliomyelitis patient was not considered possible for two reasons: (1) discomfort to the patient — IPP had always been administered either through a face mask, a BMR mouthpiece with nose clamp, an endotracheal tube, or a tracheotomy tube, all of which are uncomfortable; (2) difficulty of regulation — it was assumed that a closed system must always be maintained and the force and quantity of air delivered would have to be too closely regulated to be practical. It was not appreciated that OIPPB would permit regulation of tidal volume by the patient himself, assure the patient's comfort, and allow for easy regulation of pressure and flow.

OIPPB Method

Reports in the literature[6] and observations in this center led us to believe that the administration of positive pressure to the convalescing, conscious patient could be considerably simplified. It was known that almost any patient, however low his vital capacity, is able to cycle a demand valve (Bennett) attached to an oxygen tank and be adequately ventilated for a period of time. The face mask, the nose clamp, and the rigid mouthpiece that could not be recovered by the paralyzed patient once dropped could be replaced by a simple mouthpiece.

A small, rubber-covered plastic mouthpiece was devised to be grasped by the patient between his teeth so that it could be released and held as desired (fig. 1). A cycling pump replaced the demand valve. The patient was taught to prevent escape of air through the nose by closure of the soft palate and to vent excess air at the mouth. Thus, control of the volume of each breath was given back to the patient. Although air compressors, water pumps, bellows, and other devices were available for delivery of IPP, the chest respirator units were found most suitable because pressure, volume, and rate can be regulated and the units are not cumbersome. The air can be filtered through gauze pads.

Cuirass respirators were originally designed to be used in a closed system (cylinder, hose, and properly fitted

Fig. 1—Positive pressure is delivered to the patient's mouth through a hose and pipestem mouthpiece which can be released and grasped at will.

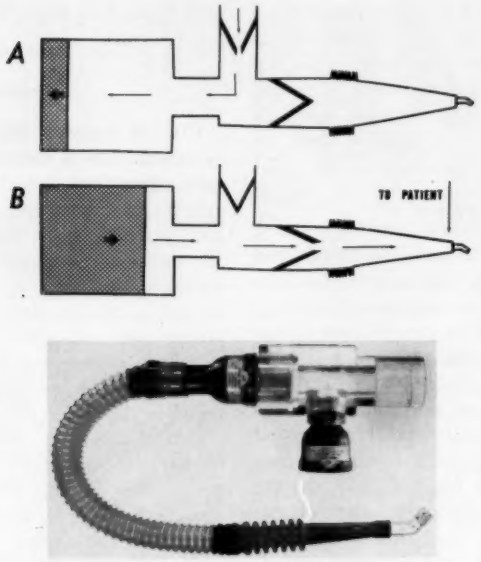

Fig. 2 — Piston type pumps require a valving system (shown diagrammatically). A hollow T-bar with 2 valves allows air to fill the cylinder on the downstroke, A. The path of air to the patient during the upstroke is shown in B. The bottom figure shows the apparatus complete with hose, flex tube, and rubber-covered plastic mouthpiece.

cuirass). Therefore, units employing the piston principle (Huxley, Monaghan P-12, and MHR), had to be adapted for use with an open system such as the OIPPB method to allow the piston to refill on the downstroke, as shown in figure 2. Some units employing the centrifugal blower principle (Monaghan 115) required only the adjustment of a single control to regulate the positive pressure. In another group (Thompson Portable and Monaghan 167), the blower speed controlled both negative and positive pressure and a check valve was necessary to eliminate the negative pressure phase of the cycle.

The patient is taught to exhale through the nose or around the mouthpiece to prevent rebreathing of expired air. However, as an added precaution, a check valve is included in the system. Exhalation valves can be used but present the disadvantage of increasing dead space somewhat.

Results: Case Reports

OIPPB proved useful for mechanically controlled ventilation and as a physical therapeutic measure. Thirty-one patients used OIPPB from 1 to 8 hours daily as a breathing aid. An additional three patients used this aid exclusively as a physical therapeutic measure to gain mobility of the rib cage. Thus OIPPB was of value in the care of 34 of 53 patients requiring respiratory aids (64 per cent).

The following cases illustrate some areas in which OIPPB is superior to other methods of mechanically controlled ventilation:

Case 1. A 30-year-old pilot contracted poliomyelitis on August 13, 1953, with rapid onset of tetraplegia and total respiratory paralysis. Both upper extremities were paralyzed and the lower extremities were weak. His vital capacity was less than 0.1 liter and he was unable to breathe unassisted for more than a few seconds. During the next 10 months he was gradually weaned to the cuirass respirator, but he could not use the rocking bed because of inadequate ventilation.

One year after onset the patient was taught glossopharyngeal breathing.[17] By

this means his vital capacity reached 1.7 liter and he could be independent of breathing aids for one hour. The leg power was eventually sufficient to permit the patient to pump his own specially devised respirator, a bellows with an attached hose and mouthpiece. He could walk, suitably braced, for a limited distance using OIPPB.[18]

Although the use of his hands was extremely limited, with adaptive equipment he was able to feed himself and use a dictaphone and an electric typewriter. These latter accomplishments were important as they enabled him to contribute to his family's support, utilizing his knowledge of aeronautics. OIPPB proved useful in this case as it permitted considerable latitude for activities despite the constant necessity for artificial respiration. He has used this method for 1 to 8 hours daily over a 4-year period.

Case 2. In 1947 poliomyelitis with respiratory failure developed in one of our male patients, who was 15 years old at the time. He required the tank respirator almost continuously until 1950. His only strength was in the hands and lower arms. He gradually learned to use his neck muscles for breathing and by this means eventually spent 12 hours daily outside of the tank respirator. He did not sit up, as he was unable to breathe as well in this position, and his only independent activity was reading.

Ten years after onset the patient was admitted to the respirator center where other mechanical breathing aids were introduced in order to wean him from the tank respirator. Using OIPPB and a back and abdominal support, the patient, despite so many years of recumbency, quickly acquired the ability to sit in a chair for up to 6 hours. Activities could then include self-feeding, shaving, writing, typing, and daily light handcraft work with the aid of hand splints and ball-bearing arm supports. Because of the simplicity and portability of the OIPPB equipment he was eventually able to ride in an automobile and participate in social activities. This was accomplished within 5 months for a patient who had remained recumbent and dependent upon the tank respirator for 10 years.

Discussion

OIPPB permits better access to the conscious patient who requires mechanically controlled ventilation, facilitating examination, medical and nursing care, and physical and occupational therapy. In addition, it permits the patient to regulate his *tidal volume* by accepting all or a part of a particular breath or by taking two consecutive breaths without exhaling in-between to talk, call, or cough. And it permits the patient to regulate his *rate* to some extent by rejecting a breath. Some patients, able to breathe unassisted for minutes or hours, may use this modality only occasionally by simply turning the head to grasp the mouthpiece when their respiratory muscles begin to tire.

The method is applicable in many situations; in bed, sitting, standing, or even on automobile rides, in which case power for the pump can be obtained either through the electrical system of the car or from batteries.

In order to obtain best results with this method its limitations must be recognized. Time is required for training the subject to prevent escape of air through the nose and to regulate the inflow of air. Further, a patient who has been accustomed to ventilation through the uncuffed intratracheal tube and has consequently learned to *close* the larynx during inspiration (to prevent retrograde flow of air) must now learn to *open* it during this phase.

Some patients have difficulty eating while using this method and occasionally report dryness of the mouth. Because of the possibility of retarded venous return to the heart, a maximum of 8-hours use per day has been tentatively set for our patients until safe tolerance for longer periods can be demonstrated.

An abdominal support aids expiration and prevents venous pooling, particularly for patients in the upright position with weak abdominal muscles.[19, 20] The importance of this new method is reflected by the patient's return of confidence

when he realizes that he has regained control, at least to some extent, of his breathing.

Physiologic Effects of Positive Pressure Breathing

Positive pressure inflates the lungs by forcing air into the respiratory passages. When the pressure in the airways is greater than the ambient pressure, the lungs are inflated and the chest expands. Expiration then takes place passively when the pressure returns to normal since the chest is elastic and tends to deflate to its resting position.

Positive pressure is mainly used for three clinical purposes: inhalation of nebulized medicinal fluids, damming venous return in heart failure, and to provide artificial respiration. Positive pressure both intermittently and continuously has also been used in a variety of experimental situations.[21] Added impetus was given to this field of study when it was shown that changes in intraesophageal pressure are closely related to changes in intrapleural pressure.[22-28]

Intermittent Positive Pressure of Brief Duration. Intermittent positive pressure breathing increases arterial oxygen saturation and decreases the alveolar-arterial gradient in the event of unequal alveolar aeration and perfusion. Presumably those alveoli with impaired ventilation are more uniformly aerated.[29, 30]

Intermittent Positive Pressure Used for Longer Intervals. Normal human subjects respond with an elevation in intrapleural and right atrial pressure, reduction of venous return and cardiac output, hyperventilation, peripheral vasoconstriction, and increased venous pressure.[1, 19, 31, 32]

Continuous Positive Pressure Applied during Inspiration and Expiration. Even healthy young men can tolerate only relatively low pressure under these conditions. The incidence of collapse rises rapidly at pressures higher than 15 mm. Hg if given continuously during inspiration and expiration.

Continuous pressure breathing causes a greater diminution in cardiac output than does intermittent pressure breathing. Blood pressure rises due to constriction of arterioles (despite a diminished circulatory volume produced by pooling of blood in the venous system and by slight increases in capillary filtration caused by increase in venous pressure). Increased venous pressure partially compensates for the increase in intrathoracic pressure in normals.[19]

A jacket protects against effects of pressure presumably by preventing pooling of blood in the venous reservoir of the abdomen. Limiting factors are fatigue of expiratory muscles along with interference with venous return.[19]

Mean Mask (Oral) Pressure. Changes in circulation are best related to the mean positive pressure applied to the airway. The mean pressure appears to be the most important factor influencing the circulation. If it does not exceed ambient by more than 10-15 mm. Hg the responses referred to above do not present a serious problem. In normals there is a sufficient increase of peripheral venous pressure to restore the previous level of cardiac output within a minute or so.[31] The circulatory impairment due to positive inspiratory pressure can be compensated during expiration if 30 to 50 per cent of the cycle is at near-atmospheric pressure.[1, 33, 34] Tilting the patient to a 6 to 10 degrees head-low position during IPPB served to increase cardiac output and stroke volume.[35]

Ideal Mask (Oral) Pressure. A desirable type of intermittent positive pressure breathing holds mean pressure as near atmospheric as possible, applies a pressure which gradually increases during inspiration, drops sharply at onset of expiration, and maintains expiratory time at least equal to inspiratory time.[1, 33, 34] Maloney and co-workers concluded that mechanical respirators providing mean pressure at least as low as atmospheric (alternating positive and negative pressures) are theoretically safest particularly for non-normals.[36] Achieving a mean mask (mouth) pressure of zero is another problem, however, as suck-and-blow devices are not without hazard.[37] It appears, moreover, that standard American respirators do not significantly

depress the cardiac output or blood pressure of human subjects with essentially normal circulatory responses even though the mean mask pressure is moderately elevated.[31, 33, 36, 38]

Summary and Conclusions

1. A new method of administering intermittent positive pressure breathing is described in which filtered room air is intermittently pumped to the patient's mouth through a hose and pipestem mouthpiece. Pressure is provided by a cuirass pump.
2. Oral intermittent positive pressure breathing (OIPPB) has proved to be a practical method of artificial ventilation for the convalescing poliomyelitis patient. Patients can regulate the intake of air in two ways: By closing or opening the soft palate as a valve and by permitting escape of excess air at the mouth.
3. OIPPB offers several advantages over other methods of artificial ventilation: It allows self-regulation of tidal volume by the patient; it permits partial self-regulation of rate; it simplifies care because of better access to the patient; it frees the patient from the encumbrance of a shell or tank; it permits standing or walking where possible; it maintains mobility of the rib cage.
4. The limitations of the method are discussed. Proper training is necessary, eating is difficult, and dryness of the mouth may occur.
5. This method like other methods embodying the principle of positive pressure may effect the peripheral circulation. Effects noted are elevation of intrapleural and right atrial pressure, reduction of venous return, peripheral vasoconstriction, and increased venous pressure. However, these circulatory changes are minimal when expiration takes place against ambient pressure and expiratory time exceeds or at least equals inspiratory time. Even severely paralyzed patients are able to tolerate 8-hours use per day.
6. The method proved useful in 34 of 53 poliomyelitis patients requiring mechanically controlled ventilation. Two case reports are given.

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Recognizing Anxiety in Counseling

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● Severe emotional deficiencies may overwhelm even the most healthy personality. Some personality structures are totally incapable of handling average stresses, conflicts, tensions and frustrations. Yet, man is quite capable of dealing with considerable stress and anxiety before being emotionally overcome. It is important for a counselor to remember that if he understands the causes for anxiety, it will greatly increase his rapport with those with whom he works. A counselor should also realize however, that the mere discontinuance of a client's behavior or surface symptoms, is not indication of solution to the basic insecurity causing such symptoms.

In any counseling relationship, the vital process of human growth is perhaps the most important factor with which a counselor should be concerned. It is necessary for him to examine the human personality and recognize that, essentially, man is a psychosomatic animal. The somatic, body, or material part of a man is readily apparent through its functions and operations. The psychic or nonmaterial part, however, deals with a man's psychological or emotional self, and is the part with which a counselor should be most intimately concerned.

As the personality develops at various age levels from birth through death, the human organism encounters very definite physical and emotional needs. The physical needs of a man can be seen in the desire of the organism to achieve a certain amount of oral, anal, and genital pleasures and satisfactions, which normally are achieved by the process of physical and emotional maturation. The psychological or emotional needs, on the other hand, are seen in the desire of a man to *feel* loved, wanted, and accepted; to *feel* safe and secure; to *feel* important, significant, and worthwhile.

If a man fails to have these emotional needs met adequately at any stage of his development, it may cause a distortion in his personality, and this very distortion may manifest itself in anxiety at some later stage of his development. In an effort to fill these needs adequately, a man may face certain stresses, conflicts, and frustrations. *Adjustment difficulties, then, represent a breakdown in a man's ability to adapt,* caused by his basic physical and emotional needs not being filled adequately.

Anxiety

The realization and consequent fear that these essential emotional needs will not be met, or the possibility of their being met inadequately, seriously threatened, or deprived, cause practically all human problems of frustration. The inability of an individual to handle frustrations, then, causes anxiety which may be made manifest in many different ways. Since anxiety is such a fundamental reaction in human relationship problems, it is important for a counselor to be able to recognize it in his clients.

Anxiety as such may assume various forms. Most of us are familiar with "hysterics," which is nothing more than an acute anxiety attack. Very probably, everyone now alive has seen or experienced this kind of an open anxiety attack. Perhaps during a time of stress and tension we may have experienced the usual symptoms of excessive perspiration, weakness, trembling, rapid heart beat, tightening of the stomach muscles, and, in extreme cases, possibly even nausea and regurgitation. In really serious cases, the individual may even panic and resort to flight. This anxiety, this general feeling of apprehension on a client's part, is an *involuntary, unconsciously controlled reaction, over which no voluntary control can be exerted.*

Anxious Behavior

In the majority of cases, however, anxiety appears far more frequently and manifests itself in many hidden ways, the most frequent of which is in the form of *anxious behavior.* This is really a poor substitute way used by clients to get back their missing emotional needs. It is important for any counselor to remember that if a client's tension is too prolonged and severe, actual tissue and functional changes may begin to occur in the body. A client's unmet emotional needs help to create this anxiety. In

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turn, this anxiety is converted to a nervous tension which may begin to produce functional, even pathological, changes in the body. Anxious behavior, then, as well as many forms of psychosomatic illness, are inadequate patterns adopted by clients for handling their own particular brand of anxiety.

The long list of difficult-problem clients that any counselor encounters is, in reality, almost a list of the various kinds of problem behavior. Actually, these behavior patterns run to the extremes of *fighting* to get one's missing emotional needs filled, and *flight*, or running away in order to have the emotional needs met.

If a client is critical, aggressive, and inclined to be controlling, he is demonstrating a behavior pattern of reaching out actively and fighting to get his emotional needs met. When this kind of client tries to "run the show," he is trying to make sure that the counselor gives him full attention, which to the client is the equivalent of being loved, wanted, and accepted. By his actions, the client is making sure that the counselor treats him with respect, which in reality is a client's attempt to meet his own emotional needs for a feeling of importance. By his actions, the client is trying to make sure that the counselor does his best for him, to see that his interests are properly cared for so that he will be safe and secure. Most counselors know from experience that the critical, aggressive, and demanding client, who tries to control the counseling situation and orders the counselor around, is often quite insecure emotionally.

Without being aware of it, a client may have unconsciously slipped into this kind of a behavior pattern because it somehow makes up for the missing acceptance, significance, and safety which he needs. This kind of client has a need to be aggressive because it helps him to solve his own basic anxiety and emotional insecurity. If, on the other hand, a client shows a behavior pattern of being shy, timid, evasive, and dependent, a counselor should realize that this is also a pattern which some clients unconsciously adopt because it solves an anxiety or an insecurity for them. By being very nice and never crossing anyone, by being a "yes man" and dodging any crises or decisions, this client feels that people in general and the counselor in particular will be more apt to keep on liking him; he will rarely lose status (his need for significance), and he certainly will be far safer than a client who enters into conflict. When, however, a counselor looks behind a client's behavior, he can see that it usually has a meaning. It is a client's attempt to win acceptance, significance, and safety.

It is important for any counselor to realize that the role played by a client is *not consciously assumed*. It is an example of how the client's unconscious mind is unable to meet fully his emotional needs. His unconscious mind, then, initiates a pattern of behavior which assures that his needs will be met. Actually, many of the personality traits which are difficult for a counselor to handle are ways of behavior which clients have adopted unconsciously, because they help to preserve what little security the client has, or in some way they compensate the client for his missing emotional needs. Strangely enough, such clients do not appear to be anxious on the surface. By their actions, they have unconsciously contrived to free themselves of the mental pain of anxiety by converting their anxiety to anxious behavior.

Psychosomatic Illness

If a counselor superficially tries to block a client from acting in this fashion, the anxiety will still be there, and can manifest itself in other forms. Some outwardly calm clients, for example, have unconsciously managed to escape the mentally painful experience of an open anxiety attack by converting their anxiety to nervous tension and psychosomatic illness. This may show itself by a disturbed activity of the nervous system, thus affecting the correct functioning of the internal organs. Medical science is demonstrating daily that anxiety is certainly responsible for a great many cases of ulcers, asthma, angina, high blood pressure, and skin diseases.

Neuroses

Some anxious clients have even adopted some of the various neuroses in an attempt to solve their anxiety. Any attempt on a client's part to avoid a threatening situation may well result in hysteria. In such cases, the client's unconscious mind takes over and creates symptoms that help him to dramatize his avoidance and evasion of the threatening situation. A migraine headache, for example, may indicate a client's unconscious refusal to think about a frustrating situation. Psychological blindness may well indicate that a client cannot bear to see something. Hysterical deafness may show a client's refusal or inability to listen to an emotionally charged situation. Functional paralysis literally shouts a client's refusal to carry through on a situation which he considers odious in the first place. The hyperventilation syndrome is a good example of how a client cannot breathe or swallow because of a possible problem situation in his own emotional life, and indeed, this is his attempt to show the world that he is physically, rather than emotionally or psychically, ill.

When a client's anxiety is unconsciously converted to a morbid concern about matters pertaining to his own health, we have a condition of hypochondria, and in really extreme cases may even go on to neurasthenia. Since it is more acceptable socially to be sick than anxious, the client will receive more attention and pity from being ill. In a way, this particular neurosis is simply another poor attempt to solve an anxiety by an inadequate effort to win acceptance, significance, attention, and consideration through the "use" of illness.

Psychoses

In an obsessive-compulsive neurosis, on the other hand, the client may try to ward off his anxiety by working it off physically or mentally in endlessly repeated acts. The client feels that the regular and routine repetition of these acts is the same as a secret formula for keeping the anxiety away from him. If, for example, a client walks exactly the same way to the counselor's office for an interview, and keeps each little routine of his life exactly the same, he will be safe. If, however, he breaks this routine, very frequently an open anxiety attack will occur.

In a phobia, for example, we can see that a client's anxiety is manifested in an overwhelming, more or less specific fear, usually groundless though of abnormal intensity, which rarely ever shows itself in an open anxiety attack. In any one of these specific neuroses, there is a very specific pattern on the part of the client, in which his unconscious mind saves him from the pain of an open anxiety attack by converting his anxiety to symptoms of behavior that, in themselves, secure for him some of his missing emotional needs.

In certain situations, however, a client's anxiety may be so severe and of such long duration that living in the real world becomes too overwhelming for him. When such is the case, the client's unconscious mind takes over and solves his problem by taking him out of reality and into a dream world. The client who is out of contact with reality is psychotic, and satisfactions too difficult for him to strive for or attain in reality can now be "dreamed" to exist.

True Character Disorders

Thus far, we have discussed how anxiety can be manifested through the use of anxious behavior, psychosomatic illness, the neuroses, and psychoses. There is, however, yet another way in which anxiety may show itself in a client's behavior. For example, some clients have been subjected to so much emotional deprivation and anxiety in their lives that it has definitely warped their personalities. These are the clients who present true character disorders. If, as a very young child, a client was unloved and rejected, it may have so seriously deprived him of the emotional love and safety which he needed that he never grew above the level of self love. As a result, this type of client aggressively may have set out to punish and control others as a reaction against his own rejection. As he grew up, he may have become a smooth exploiter of others; most likely

he has no conscience, and very probably he is capable of loving himself only. In such a client can be seen the gradual evolution of a twisted, antisocial, psychopathic personality. This is the end result of emotional starvation, anxiety, and an inadequate, inferior attempt on the client's part to secure the regard, safety, and affection which was denied him in early childhood.

General Human Relationship Problems

We can see, then, that anxiety may present itself in many and various forms, all of which have a direct bearing on the success of a counseling relationship. And, while anxious behavior, psychosomatic illness, the neuroses, and psychoses represent a partial solution and a poor response to anxiety on the part of a client, it should be emphasized that these means which a client "uses" are still only a partial and inadequate solution to his problem.

In the course of his work, a counselor can expect to meet some open anxiety attacks, many forms of anxious behavior, some psychosomatic illness, and a few true neurotics. Occasionally, he will encounter those clients who are psychotic or who have true character disorders. Most of the time, however, the counselor will meet problems that center around strictly human relationships. Most of these problems will be found in anxious, emotionally insecure, and nervous clients who will need help in the form of an emotionally supporting counseling relationship. In order for any counselor to establish a relationship with this type of client, he will need to understand and accept objectively the client's emotional immaturity and insecurity. When a counselor can see that difficult or problem behavior is really an anxious client's way of solving his own emotional insecurity, then the counselor can plan out his relationship with that client more intelligently.

Any counselor should realize that even the most healthy personality may be overwhelmed by severe emotional lacks. Some individuals have personality structures which render them incapable of handling even average stresses, conflicts, tensions, and frustrations. Yet, man is quite capable of dealing with considerable stress and anxiety before finally being overcome by them. The important thing for any counselor to remember is that if he personally understands the anxiety behind a client's poor behavior, it may help him to avoid the easy trap of being critical, or of giving advice to anxious clients. It may help the counselor to realize that the mere stopping of the client's behavior, or the surface symptoms, does not at all handle the basic insecurity that causes the symptoms.

CANADIAN ASSOCIATION OF PHYSICAL MEDICINE AND REHABILITATION MEETS

The Canadian Association of Physical Medicine and Rehabilitation will hold its 7th annual meeting in the Lord Nelson Hotel, Halifax, N. S., on June 4-6, 1959.

Inquiries should be directed to M. Mongeau, M.D., Secretary, 6265 Hudson Rd., Montreal 26, Quebec, Canada.

All physicians interested in physical medicine and rehabilitation are most welcome to attend the conference.

abstracts

An Experimental Study of Auditory Threshold Acuity in Children with Cerebral Palsy by PGSR and Other Techniques. Irwin Lehrhoff. Ann. Otol. Rhin. & Laryng. **67**:643 (Sept.) 1958.

The author has compared the findings in three groups of subjects; 30 normal, 30 athetoid, and 30 spastic boys between the ages of 7 and 12. Careful selection was employed to insure that hearing and intelligence were normal. The procedure of testing is described in detail, as is the method of selection of subjects.

The findings indicate a longer latent period from onset of stimulus to beginning of reaction, a need for more initial shocking to establish conditioning and for more reinforcement to maintain it, and low skin resistance in the cerebral palsy group when compared with normals.

The galvanic skin response did not yield valid and reliable results in the cerebral palsy group, but the thresholds obtained by PGSR and Pure Tone audiometry revealed a close relationship. Differences were not significant between right and left ears for any of the groups, nor were there significant differences between the spastic and athetoid groups which were studied.

Neurologic Assessment of Some Deaf and Aphasic Children. Robert Goldstein; William M. Landau, and Frank R. Kleffner. Ann. Otol. Rhin. & Laryng. **67**:468 (June) 1958.

This is a careful study of 114 deaf and 69 aphasic children regarding history, physical findings, auditory and vestibular responses. Meningitis and severe infections in infancy were much more common in the histories of deaf children, whereas complications of birth, convulsions, and congenital brain anomalies appeared most frequently among the aphasic children. Rubella and other complications of pregnancy were of about equal frequency for the two groups.

The authors found several distinctive audiometric patterns which can be associated with etiological factors. Vestibular function was normal in more deaf children (51 per cent) than aphasics (37 per cent). Major motor abnormalities were found in only 3.5 per cent of the deaf, and in 23 per cent of the aphasic children. Inability to comprehend non-verbal perceptive tasks was shown in 23 per cent of the aphasic as compared to 1.8 per cent of the deaf children. Although about 40 per cent of each group showed abnormal EEG's, more focal abnormalities were seen in aphasic (15 per cent) than in deaf children (6 per cent). Skull x-rays were abnormal in only seven of the 157 children who had these studies. Only one of those was deaf.

Gastrocnemius Recession. L. M. Strayer. J. Bone & Joint Surg. **40-A**:109 (Oct.) 1958.

Twenty-three children, ranging in age from 2 to 14 years, and afflicted with spastic cerebral palsy were subjected to gastrocnemius recession. A procedure for recession of the gastrocnemius first presented by the author in 1950 was used. The insertions of the biarticular gastrocnemius and plantaris muscles were released from tension on the tendo achillis until the foot could be brought to dorsiflexion of 90 degrees or more.

Strayer thinks this procedure is unique in that it is not only anatomicomechanical but also neurophysiological in that proprioceptive impulses which originate in the stretched, contracted muscles are eliminated. However, it would appear that other accepted methods of lengthening the tendo achillis would produce the same physiological changes.

The patients were divided into two groups. Group I included those children who had never walked prior to surgery, and Group II included patients who had walked in some fashion prior to surgery.

Results were measured in terms of progression in walking, not simply in terms of the effect on the local deformity. The results were classified as excellent if the patient achieved balance and could walk without crutches or braces; fair if the patient could walk effectively with braces or crutches, and poor if no basic change was noted.

Excellent results were noted in 12 of 16 children who had never walked prior to surgery. Undoubtedly many of these children would have learned to walk during their normal course of development even without any form of surgery and perhaps without any treatment at all.

Management of Brachial-Plexus Injuries (Traction Type). J. F. Tracy, and E. W. Brannon. J. Bone & Joint Surg. **40-A**:1031 (Oct.) 1958.

Brachial plexus injuries of the traction type were usually due to the application of a sufficient force which will produce stretching, tearing, or rupture of the anatomical elements lying between the neck and the arm. Damage may occur at any level of nerve roots, trunks, divisions, or cords of the plexus to produce paralysis depending on distribution of forces.

Early management was usually conservative and consisted of providing support in the form of balanced shoulder suspension, shoulder spica, or airplane splint. When the patient's general condition permitted, a myelogram was made. If avulsion were evident, early reconstruction surgery was considered on areas of functional loss attributable to the neurological deficit corresponding to the avulsion.

The authors present a series of 16 patients with significant permanent neurological deficit as a result of brachial plexus injuries. Fourteen reconstructive surgical procedures were performed in 10 patients and satisfactory results were noted in 13 of the 14 procedures. No indication is given of the criteria utilized to determine the functional result of the surgery but the satisfactory results would appear to be unusually high especially since many of the problems involved the hands and wrists.

Soviet Psychology and Psychophysiology. Gregory Razran. Science **128**:1187 (Nov. 14) 1958.

This is a survey of Russian contributions in psychology and "psychophysiology" — higher nervous activity — which is similar to American experimental psychology. There are a number of institutes engaged in these studies. The author believes psychology proper, or applied psychology, to have suffered greatly by communist constriction in contrast to the relative freedom of study in psychophysiology.

Extremely interesting work in the neural basis of learning, viscero-visceral and viscero-somatic conditioning are touched upon. Of particular interest, perhaps, are conditioning studies in rabbits leading to electroencephalographic changes which were reversed by negative conditioning, conditioning of human subjects to verbal stimuli, and the like. It is evident from the review that much material in the area of neurology of learning is available from the Russian literature.

Superficial and Deep Reflexes in Spinal Cord Injuries. A. J. Arieff; E. L. Tigey, and S. W. Pyzik. Neurology **8**:933 (Dec.) 1958.

Cases of anatomical transection of the spinal cord with preservation of the superficial abdominal and cremasteric reflexes were observed. This apparent inconsistency was the subject of investigation in this paper. The authors recorded the percentage of superficial abdominal, cremasteric and deep abdominal reflexes present in these patients.

The authors studied a total of 48 patients, the age of whose lesions ranged from seven months to 12 years and whose levels varied from C5-D7. Eleven of these patients had anatomically severed cords proved at surgery, 22 had physiologically complete lesions and 15 had physiologically incomplete lesions by neurological examination.

There was not a great deal of difference in the per cent of patients with superficial abdominal reflexes and the per cent of patients with deep abdominal reflexes. One would assume that the high incidence of superficial abdominal reflexes in anatomically complete lesions would indicate the return to a simple reflex devoid of centripetal control.

INTERNATIONAL POST-GRADUATE MEDICAL COURSE

The Czechoslovak Physiatric Society will hold its 19th international post-graduate medical course in Karlovy Vary/Carlsbad, the world-famous spa, from September 14-19, 1959.

The main theme will be gastric diseases. Papers will be presented by leading research workers from all over the world. Official languages are English, French, Russian, German, Slovak and Czech; there will be simultaneous interpretation of these languages.

Immediately after this course, the Czechoslovak Society of Gastroenterology and Nutrition is organizing its Congress with international participation from September 21-24, also in Carlsbad.

For application and inquiries, direct requests to Czechoslovak Physiatric Society/Albertov 7, Prague 2, Czechoslovakia.

book reviews

The reviews here published have been prepared by competent authorities and do not necessarily represent the opinions of the American Congress of Physical Medicine and Rehabilitation and/or the American Academy of Physical Medicine and Rehabilitation.

MEDICAL ELECTRICAL EQUIPMENT. Edited by *Robert E. Molloy*, M.B. Cloth. Price, $15.00. Pp. 312, with illustrations. Philosophical Library, Inc., 15 E. Fortieth St., New York 16, 1958.

The purpose of this book is to provide authoritative information on the principles, operation, care, and routine maintenance of medical electrical apparatus in clear terms which do not require a deep knowledge of electricity by the reader.

Twenty-one individuals contributed to the text; most of them represent commercial suppliers. There are 14 chapters, the seventh one of which is entitled "Electrical Instruments and Lamps Used in Physical Medicine."

Apparatus discussed includes electrical stimulators, short wave diathermies, ultrasonic generators, electromyographs, infrared and ultraviolet lamps. The amount of information given on each instrument is skimpy and inadequate for any one truly interested in acquiring knowledge of principles and care. No references are provided for those who might be interested in pursuing the subject more thoroughly.

The physiatrist would do much better investing the price for this book in a modern physical medicine volume where he will get not only the information on instrumentation but much more. *(A. A. R., M.D.)*

LIGAMENT AND TENDON RELAXATION TREATED BY PROLOTHERAPY. Third edition. By *George Stuart Hackett*, M.D. Cloth. Price, $6.75. Pp. 151, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1958.

This book presents a challenge. Dr. Hackett criticizes the medical profession for its lack of interest and knowledge of the ligaments and the tendons, particularly as they attach in the low back, spine and cervical areas. It is his opinion that much of the pain found in the skeletal areas is due to relaxed ligaments or tendons. He recognizes two types of individuals, the close-jointed and loose-jointed. All loose-jointed individuals have relaxed ligaments and the strain upon these may cause pain. A second type of individual who has relaxed ligaments is the individual who has grown up doing very little in the way of exercise. The third is the individual who has sustained a definite sprain or strain. Tenderness indicates a trigger point over a relaxed ligament or tendon. Apparently Dr. Hackett does not recognize as a trigger point a tender area at a distance from the possible point of pathology. He recognizes radiating pain from the trigger point and attempts to differentiate it from a true neuritis. Though Dr. Hackett is convinced that most patients complaining of pain in the cervical area, dorsal areas or low back areas, is due to relaxed ligaments either in the cervical area or in the supra or infraspinatus ligaments along the dorsal and upper lumbar spine or in the lumbosacral or sacroiliac ligaments, he does not anywhere describe a method of diagnosing a relaxed ligament other than to note the tenderness which diagnostically should be relieved by local anesthesia and which should be treated by a sclerosing fluid with relief. Probably many of us would question whether it is really the relaxation of ligaments rather than some other pathology of the ligaments or tendons which may be causing the pain.

The author considers that injecting sclerosing fluids will relieve a very high percentage of the symptoms found, particularly in the various areas of the back and perhaps also about other joints. He is scathing in his remarks concerning much of the surgery of the back, and his one remark about exercise is to condemn it. The sclerosing fluid causes a great deal of pain, making local anesthesia at the time important and the severe reaction following requires analgesics. The area treated is supported by belts or other means for some six weeks following the injections. The theory of prolotherapy is based on the assumption that the disabled ligaments and tendons are permanently strengthened by the production of new bone and fibrous tissue cells. He does recommend some back exercises to be started six weeks following injections into the back.

This book is worthy of study. It stimulates one to consider all ligaments which may possibly be involved in any injury. Dr. Hackett is very enthusiastic about this form of treatment as anyone is for his own brainchild. Careful thought should be given to the

possible values of this treatment. *(Frances Baker, M.D.)*

SCIENTIFIC SOCIETIES IN THE UNITED STATES. By *Ralph S. Bates.* Paper. Price, $6.50. Pp. 297, with illustrations. The Technology Press, Massachusetts Institute of Technology, Columbia University Press, New York, 1958.

The latest efforts of the author are rewarding to those having recourse to using a publication such as this as a reference work.

It is true that the number of scientific societies in the United States is legion; because of this, there is every likelihood that some error could occur in research determining the actual year of establishment of various organizations throughout the United States. However, on page 151 it is stated, ". . . the American Academy of Physical Therapy, the American Congress of Physical Therapy," among others, are listed as having their beginning in 1922. It is a matter of record that both the "American Academy of Physical Therapy and the American Congress of Physical Therapy" were established in different years and under totally different names.

Nevertheless, the book is well written and does credit to its author and the publisher.

SUSPENSION THERAPY IN REHABILITATION. By *Margaret Hollis,* M.C.S.P., and *Margaret H. S. Roper,* M.C.S.P. Cloth. Price, $6.00. Pp. 220, with illustrations. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore 2, 1958.

Those people who have worked with Guthrie Smith suspension apparatus and are familiar with the book "Rehabilitation, Reeducation and Remedial Exercises" will welcome this new edition on the subject. Others who read about these technics for the first time will discover a wide variety of specific technics which have great value in the treatments of many disabilities.

Suspension therapy is among the oldest therapeutic agents, almost dating back to Celsus. Psychologically, it at times provides free movement of an affected or paralyzed part for the first time; it is a change of approach that relieves boredom that can result from tedious repetitions of the same movement. Also, psychologically and anatomically, repetitious effects increase coordination of movement, or increased range of motions, relaxation, with a lessening of fatigue. Various other mechanical gains can be obtained depending upon the results desired in terms of gravity, weight, leverage, friction and momentum. One of the most important single factors is that the use of the apparatus automatically requires the cooperation of the patient.

This book is an up-to-date practical text which clearly describes the mechanical principles, the specific technics of application for every part of the body depending upon what motions are desired, and the various methods of suspension for each.

From the very start of the book, the patient as an individual and a whole person is kept in the foreground. This is particularly reemphasized in the chapter discussing all phases of treatment that must be considered in the treatment of paraplegia and the equally complete discussion on rehabilitation after amputation.

As material and experience has been accumulated in more than 25 years, this new book is a ready reference for specific technics that are easily read and will be easy to follow. Sir Arthur Porritt, says in the Foreword, "It will have a very wide appeal to a large field of professional workers, and it sets a seal on the great work of a great pioneer." *(Nila Kirkpatrick Covalt, M.D.)*

THE CERVICAL SYNDROME. Second edition. By *Ruth Jackson,* M.D. Cloth. Price, $6.50. Pp. 197, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1958.

This is the second edition of a monograph which will be of interest to anyone concerned with the diagnosis and treatment of problems involving the neck. This new edition includes additional illustrations and amplification of various points presented in the first edition, but it is essentially similar.

There is an excellent section on the anatomy of the cervical spine and also on the mechanism of cervical root irritation. The author assumes that the symptomatology of the cervical syndrome is entirely the result of mechanical root irritation. Neurosurgeons probably would disagree with her conclusions that extruded disc material rarely protrudes posteriorly and posterior-laterally in the cervical spine to produce root compression.

The next sections deal with etiology and diagnosis. It is hard to evaluate some of the descriptions of symptoms and findings because, although neck problems are classified into five different groups, they are then discussed as a unit. There are a number of controversial statements with which one might disagree. The author gives the definite impression that degenerative changes in the cervical spine inevitably follow sprains. Certainly everyone who works with these patients has noted such findings with no history of injury. She also relates calcific deposits in shoulders to neck injuries although it is usually conceded that these can occur without neck involvement.

The author states that the radicular pain and tenderness and sensory changes in cervical syndrome follow fairly definite patterns corresponding to the distribution of the nerve

roots. In the reviewer's experience these sensory changes often follow no known anatomical pattern. The implication that the emotional factors in these patients can be easily corrected and subsequently ruled out is certainly misleading.

The statement is made that 95 per cent of x-rays in these cases show one or more subluxations. This sounds as if the author may be over-reading the radiographs, which is also the impression one gets when looking at the illustrations. Another controversial statement made is that cases with symptoms of occipital headaches and "blackouts" show fractures of the odontoid process and of the lateral articular processes usually. This has definitely not been the reviewer's experience.

Treatment is discussed under the headings of heat, massage, injection of local anesthetics, traction, correction of poor posture, immobilization, use of the contour pillow, drugs, and psychotherapy. The author prefers traction in the form of motorized intermittent traction. Her recommendations give the impression that patients should be cured with a maximum of 15 intermittent traction treatments or at least kept comfortable with one treatment per week. Immobilization with collars or braces is considered essential in the treatment of all acute injuries. This should be "continued until all symptoms have subsided and then gradually discontinued." This statement makes weaning a patient from a collar sound far too easy.

The use of a local anesthetic is claimed always to give dramatic relief in the cases of nerve root irritation and thus clarify the diagnosis. Again, this has not been found valid in the reviewer's experience.

The author has obviously put much effort into the preparation of this book and it contains many valuable pieces of information. However, it is felt that the person without much experience in the treatment of cervical problems may be misled by the author's interpretation of x-rays and physical findings and by the implied ease of obtaining good end results.

THERAPEUTIC EXERCISE. Edited by *Sidney Licht*, M.D. Cloth. Price, $16.00. Pp. 893. Elizabeth Licht, Publisher, 360 Fountain Ave., New Haven, Conn., 1958.

The statement by the publisher on the inside of the dust cover of this book expresses the extent, scope and purpose of its being. It is not a "cookbook" of exercises for specific diseases. As a matter of fact, very few specific exercises are given except in chapters 15, 19, 21, 24, 29 and 33.

The book is rather a compilation of discussions by authorities, on the use of exercise. It involves the anatomy, kinesiology and physiology of motion as used to restore or maintain a certain state of health. Each discussion includes the underlying abnormal or pathologic state, the philosophy, rationale and therapeutic indications for exercise or motion. This even includes the chapter, "Exercise in Mental Disease."

All chapters do not extole the virtues of exercise as a cure for all body ills. It is enlightening to read such frank expressions of exercise failures; for one invariably, expects that the book will not contain material adverse to the subject. However, as a practicing physician, one expects scientific honesty especially in the face of "fads" and cults which use exercise for "cure alls." These authors explain why and when to use exercise, as well as, when and why not to use it.

The first half of the book is devoted to the underlying principles of exercise while the second half is devoted to discussions of various disabilities in which exercise may be used for the benefit of the patient. Some of the chapters appear to be too brief, others too long, but generally the balance is good. The general tone is directed to the physicians' understanding of the role of exercise as a part of treatment of patients with disabilities. It does not enter into disputes of exercise versus other accepted medical methods of treatment.

The book is well prepared and relatively free of errors. Some of the illustrations are not too lucid and photographs might have served to better explain the text. Paper, printing and binding are excellent.

The book is a valuable asset to every doctor who may use exercise as a part of the treatment of his patients. It should be a must to all who practice physical medicine and rehabilitation and should be on the shelves of all hospitals, medical, physical therapy and occupational therapy schools.

CLAYTON'S ELECTROTHERAPY AND ACTINOTHERAPY. Third edition. By *Pauline M. Scott*. Cloth. Price, $6.50. Pp. 427. The Williams & Wilkins Company, Mt. Royal & Guilford Aves., Baltimore 2, 1958.

This is the third edition of a book long used by English physical therapists and is a basis of study and reference for both the preliminary and intermediate examinations of the Chartered Society of Physiotherapy.

Conciseness, clarity of detail, and absence of extraneous material are consistent. This is particularly evident in the excellent presentation of the sections on physics which are written in concise terms, clearly understandable to the student, and documented by innumerable and well-defined diagrams whenever they are indicated. Important historical developments of each of the various currents, the individuals responsible or the laws of physics to which their names are attached, are presented as terse facts without extensive biographies.

The book is divided into three main parts. Part I is Electrotherapy — Direct and Low Frequency Currents. The theme is developed from static electricity, current electricity, magnetism and meters, electromagnetic induction, on to separate discussions of D.C. and A.C. currents. The physical principles, physiological effects, apparatus used, care of apparatus, method of application, and the therapeutic use of each current and in every possible type of application, including the application through water with both full tub and Schnee baths are also considered.

Part II is Electrotherapy — High Frequency Currents. There are four chapters, with a similar format in discussion of the physics and production of high-frequency currents and details of short and long wave diathermy.

Part III is Actinotherapy. It uses the same outline in discussing in five chapters, the physics of heat and radiations, infra-red rays and ultra-violet radiation.

A mass of material, all factual, is contained in the 418 pages of the book but it is easily read and understood. Controversial issues are avoided and only basic principles are presented. The index is well organized for quick reference. *(Nila Kirkpatrick Covalt, M.D.)*

Special Course Offered

The Cook County Graduate School of Medicine announces a two-week intensive course in Neuromuscular Diseases of Children with special emphasis on cerebral palsy, to be given by Doctor Meyer A. Perlstein for the period June 15-26, 1959. This is an intensive didactic and clinical course designed for pediatricians, orthopedists, neurologists, psychiatrists and physiatrists interested in the care and treatment of children with neuromuscular handicaps. Emphasis will be placed on the practical clinical aspects of treatment and rehabilitation procedures. The course will include trips to demonstration clinics and treatment centers. The fee, $250, will include the cost of transportation and accommodations during the field trips. Registration is limited. For further information write to John W. Neal, Registrar, Cook County Graduate School of Medicine, 707 S. Wood St., Chicago, Ill.

medical news

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before date of meeting.

Personals

: : california

= *S. Malvern Dorinson,* San Francisco, participated in the panel "Chronic Bronchitis with Emphysema" at the American College of Physicians instruction course given at the University of California Medical Center.

= Participating in the Physical Medicine scientific program of the California Medical Association, 88th annual session, San Francisco, February 22-25, were *David Rubin,* Los Angeles, Chairman and Moderator; *Carrie E. Chapman,* Oakland, Secretary; and *Joseph E. Maschmeyer,* Los Angeles, Assistant Secretary. Papers were presented by *Arthur C. Jones* of Portland, Oregon and *Carrie E. Chapman.*

: : district of columbia

= *Charles D. Shields,* Washington, attended the annual scientific meeting of the United Cerebral Palsy Association and presented his contribution of "Rehabilitation of Hemiplegic Patients with Sensory Defects." Dr. Shields presided over the symposium "Rehabilitation" presented at the 65th annual convention of the Association of Military Surgeons of the U. S.

: : georgia

= At the meeting of the Board of State Governors of the American Diabetes Association held in San Francisco, *Christopher J. McLoughlin,* Atlanta, was elected chairman.

: : illinois

= *Louis B. Newman,* Chicago, delivered an illustrated lecture on "Trends in Rehabilitation" at the U. S. Naval Hospital, Great Lakes, Illinois on February 17. He addressed Northwestern University, School of Hospital Administration on March 3, giving an illustrated lecture on "Physical Medicine is Part of Total Medical Management."

= Director of the Department of Physical Medicine and Rehabilitation, Michael Reese Hospital, *Edward E. Gordon,* Chicago, was named chairman of the Rehabilitation Committee of the Chicago Heart Association. The Committee's aim is to help heart and stroke patients return to normal life. At the annual meeting of the Chicago Chapter of the National Multiple Sclerosis Society, Dr. Gordon delivered medical reports about multiple sclerosis and also demonstrated home aids for the handicapped.

= *Louis Schwartz,* Chicago, was elected Secretary-Treasurer of the Chicago Physical Medicine and Rehabilitation Society. He also participated in the 9th annual postgraduate program of the Illinois Academy of General Practice. His subject was "Manipulations, Machines and Common Sense."

= At the March meeting of the Polk County Medical Society, Des Moines, *H. Worley Kendell* of Peoria spoke on "Rehabilitation of Spinal Cord Injuries."

: : indiana

= The medical director of the Rehabilitation Center, *Rex O. McMorris,* presented the scientific program at the December meeting of the Vanderburgh County Medical Society.

: : iowa

= One of the chief speakers at a short course for registered and practical nurses on the care of cardiac patients, conducted at Davenport, November, 1958, was *William D. Paul,* Iowa City. Dr. Paul participated in the 1959 annual meeting of the Iowa State Medical Society, April 19-22 by presenting a scientific exhibit entitled "Prevention and Treatment of Ankle Sprains." He was one of ten American physicians who inspected spas and health resorts in Germany last year. The group evaluated hydrotherapy technics and other rehabilitative methods in use abroad. In cooperation with the Iowa Chapter of the Arthritis and Rheumatism Foundation, the faculties in physical medicine and orthopedic surgery at State University of Iowa College of Medicine offered a short course in Clinical Physical Medicine and Athletic Injuries in November, 1958. Dr. Paul participated by presenting a paper on "Laboratory Procedures for Diagnosis of Rheumatoid Arthritis"; giving demonstrations of physical therapy technics used in treatment of rheumatoid arthritis and also demonstrating protective taping. He was one of the speakers at a public forum on arthritis and rheumatism held in Sioux City, February 24.

= *Harry H. Samberg,* formerly of Des Moines, has been transferred from the VA Hospital there to a similar institution in

Brooklyn, where he is to head the rehabilitation service.

= At the 26th annual meeting of the American Academy of Orthopedics held in Chicago, January 24-29, *Arthur Steindler* of Iowa City conducted two instructional courses.

: : minnesota

= *George K. Stillwell,* Rochester, a member of the Section of Physical Medicine and Rehabilitation at Mayo Clinic and instructor in PM&R at Mayo Foundation, is president of the Minnesota Rehabilitation Association. Dr. Stillwell acted as medical consultant at the South Dakota Social Welfare, Public Health and Vocational Rehabilitation Conference at Huron. He also served recently as consultant at a medical writers workshop.

= *Frank H. Krusen,* Rochester, received an award at the 15th annual meeting of the American Medical Writers Association held in Chicago.

= The German Spa Association invited six American specialists in physical medicine to visit spa facilities in Europe. *Miland E. Knapp* of Minneapolis was among the group which spent approximately three weeks in Germany, Austria and Italy.

: : nebraska

= As of September 1, 1958, the Creighton University School of Medicine, received the first of five annual grants from the Office of Vocational Rehabilitation, Washington, D. C. The grant, directed by *Harold N. Neu,* Omaha, is being used to "implement personnel needed to help to train medical students and residents in the modern concepts of rehabilitation."

: : new jersey

= At the annual meeting of the American Rheumatism Association held in San Francisco, *Henry H. Kessler,* Newark, presented a symposium on "Rehabilitation of the Rheumatoid Arthritic Foot."

= The biannual Congenital Child Amputee Conference & Clinic took place at the Kessler Institute for Rehabilitation on October 18, 1958. At the educational session, Henry H. Kessler, Newark, discussed "Congenital Malformations and General Principles of Rehabilitation of the Congenital Amputee."

: : new york

= *Irvin Neufeld,* New York City, was promoted to assistant clinical professor of orthopedic surgery at New York Medical College. Dr. Neufeld was also elected to Qualified Fellow of the International College of Surgeons.

= At the 91st annual meeting of the West Virginia State Medical Association, *Howard A. Rusk,* New York City, was among the out-of-state speakers who contributed his "Stress as a Therapeutic Friend." Dr. Rusk was recipient of the 1958 Physician's Award presented by the President's Committee on Employment of the Physically Handicapped. He accepted the award at the annual meeting of the Congress of Industrial Health in Cincinnati on February 16.

= *Arthur Abramson* of Dobbs Ferry has been appointed an advisor to the Hospitalized Veterans Writing Project, a volunteer organization that furthers creative writing among patients in VA hospitals.

= Among those participating in the annual scientific session of the United Cerebral Palsy Association was *R. Plato Schwartz,* Rochester who contributed "Measurement of Motor Handicaps in Children with Neuromuscular Disorders."

= A discussion on "The Use of Braces in the Hemiplegic Patient" was also presented by *Robert C. Darling,* New York City at the UCP scientific session.

= *Joseph G. Benton,* Brooklyn, has been appointed chairman of the newly established department of rehabilitation medicine at the State University of New York Downstate Medical Center. Dr. Benton has also been appointed director of the rehabilitation department at Kings County Hospital Center in Brooklyn.

= At the United CP meeting, *George G. Deaver,* New York City, presented the "Role of Physical Therapy in Rehabilitating Upper Extremities." Chester W. Swinyard of New York City discussed the paper.

= *Nadene Coyne,* formerly of Cleveland, has been appointed coordinator of training for physicians in the department of physical medicine and rehabilitation at New York University-Bellevue Medical Center as well as director of the Respirator Center at Goldwater Memorial Hospital.

= At the State Medical Society Annual Meeting held in Milwaukee, May 5-7, *Anthony C. Cipollaro,* New York City, was listed among the distinguished guests. Dr. Cipollaro's topics were "Present Trends in Radiation Therapy in Dermatology" and "Cutaneous Malignancies."

: : north carolina

= At the annual scientific session of the United Cerebral Palsy, *Lenox D. Baker,* Durham, presented "A Rational Approach to the Surgical Needs of the Cerebral Palsied Patient" to those in attendance.

: : ohio

= *Herman J. Bearzy,* Dayton, contributed his services at the 3rd annual meeting of the American College of Surgeons held last September, where he presented "Rehabilitation of the Lower Extremity Amputee."

: : oklahoma

= *Herbert Kent,* Oklahoma City, Associate Professor, Department of PM&R, was recently elected chairman of the Cardiac-In-Agriculture and Industry Committee of the Oklahoma State Heart Association.

= CAA Aeronautical Center presented a program about "Fire Injuries" at its recent meeting last October at which *Ella M. George,* Oklahoma City, presented her contribution of "Rehabilitation of Burn Cases."

: : oregon

= "Horizons in PM&R" was presented at the Northwest Section of American Association for Rehabilitation Therapy, Inc., by *Arthur C. Jones,* Portland, who also delivered his "Welcome Address and Presentation of Subject: Cerebral Vascular Accidents" at the 10th Annual Western International Conference of Occupational and Physical Therapy. Dr. Jones was a special guest at the 88th annual session of the California Medical Association held in San Francisco on February 22-25.

= *Everill W. Fowlks,* Portland, spoke about "The Past, Present and Future of PM&R" at the chapter meeting of the Northwest Section of American Association for Rehabilitation Therapy, Inc., and also presented a "Summary of Panelists on Cerebral Vascular Accidents" at the 10th annual Western International Conference of Occupational and Physical Therapy.

: : pennsylvania

= At the 108th annual session of the Medical Society of the State of Pennsylvania, *Wm. J. Erdman II,* Philadelphia, acted as moderator for the Physical Medicine and Rehabilitation Program at which *Eleanor M. Bendler,* Philadelphia, discussed "Arthritis."

= *Igho H. Kornblueh* of Philadelphia presented the topic "Physiological and Therapeutic Effects of Ionized Air" at the meeting of the Delaware Valley Branch of the American Meteorological Society on March 26.

: : texas

= At the meeting of the Oklahoma Chapter of the American Physical Therapy Association held at the University of Oklahoma, *Odon F. von Werssowetz* of Gonzales spoke on "Bracing of Upper and Lower Extremities."

: : washington

= Participating as physiatrist on the panel of the National Rehabilitation Assn., *Sherburne Heath,* Seattle, delivered his contribution of "Special Problems in Rehabilitation, Arthritis and Epilepsy."

= A few of the subjects presented at the 35th annual session of the APTA held in Seattle were "Testing and Measurement — Purpose and Methods" by Sherburne Heath, Seattle, and others; and the "Basic Principle of the Therapeutic Application of Ultrasound" by *Justus F. Lehmann,* Seattle. The emphasis at the meeting was on better understanding of the patient and better methods of carrying out the therapy prescription of the physician.

: : wisconsin

= *Robert W. Boyle,* Milwaukee, director of physical medicine, was appointed director in charge of the construction of a complete rehabilitation center within the Milwaukee County General Hospital. The facility will include all physical restoration, vocational evaluation, psychological and social services, as well as an associated sheltered workshop. The center was made possible by grants from the federal and state Vocational Rehabilitation departments. Dr. Boyle took part in the 118th annual meeting of the State Medical Society of Wisconsin, May 5-7, by presenting a scientific exhibit entitled "The Use of Tidal Drainage in the Bladder Training of Patients with Cord Lesions and Other Neurological Disabilities."

= At the same meeting, *Edwin Welsh* of Milwaukee spoke on "Role of the Physiatrist in Amputations and Rehabilitation Facilities Available in Wisconsin."

Complete Rehabilitation Center for Milwaukee

Construction of a complete rehabilitation center within the Milwaukee County General Hospital is announced by John W. Rankin, director of the Milwaukee County Institutions and Departments. The facility will include all physical restoration, vocational evaluation, psychological and social services, as well as an associated sheltered workshop. Applications for key positions in the rehabilitation center are being accepted as it is anticipated the center will open in the summer of 1959.

The center was made possible by grants from the federal and state Vocational Rehabilitation Departments. Through the Milwaukee County institutions and departments it will be affiliated with the Marquette University School of Medicine, which plans to use it as a teaching and training center for medical students, physicians and other specialists in rehabilitation and physical medicine. Dr. Robert W. Boyle, director of physical medicine, will be in charge of the facility.

Newly Registered Therapists

February 3, 1959

Boston University, Sargent College

Hochberg, Naomi J., 4 Garrison St., Chestnut Hill, Mass.

Charity Hospital of Louisiana

Daly, Herbert N., Gen. Delvy., SLI Station, Lafayette, La.

Fuller, Carol K., Plain Rd., Nabnasset, Mass.

Kimball, Robert R., 8316 Palmetto St., New Orleans

Neale, John K., 728 S. Ashland Ave., Chicago

Rosselot, Inge K., 500 Shrewsbury Ct., New Orleans

Skinner, Robert D., 1511 Robert St., New Orleans
Smith, Geraldine B., RFD No. 1, De Kalb, Miss.

Columbia University
College of Physicians and Surgeons

Clement, Judith P., 382 Bedford Rd., Chappaqua, N. Y.

Duke University School of Medicine

Bailey, Sarah Ann, PT Dept., Baptist Mem. Hospital, Jacksonville, Fla.
Buzard, Leora Ann, Box 3242, Duke Hospital, Durham, N. C.
Chambers, Rosemary, 130 S. E. 14th St., Miami, Fla.
Gay, Alda S., 805 S. Wayne St., Arlington, Va.
Jones, Carol Ann, 1019 Varnum St., N. E., Washington, D. C.
Kurras, Richard A., 6251 S. W. 21st St., Miami, Fla.
Niehuss, Jacquelyn E., 705 Gary St., Augusta, Ga.
Nuttycombe, Elizabeth J., 611 Milledge Circle, Athens, Ga.
South, Bruce D., Rt. 2, Box 397, Durham, N. C.

University of Kansas Medical Center

Butzberger, Robert P., 70 Bourndale Rd., S., Manhasset, N. Y.
Ely, Lois Ann, Edina, Mo.
Friedmeyer, Martha S., 3604 Jefferson, Kansas City, Mo.
Godwin, Molly Sue, 7430 Williams Ave., Richmond Hts., St. Louis
Shaughnessy, Mary K., 730 S. Main, Ottawa, Kans.
Takatani, Gladys J., PO Box 1119, Hilo, Hawaii

Medical College of Virginia

Miller, Marilyn M., 473 Laurel Lane, Smoke Rise, N. J.

New York University

Samsel, Ruth L., 51 James St., Highland Park, N. J.

St. Louis University

Northcott, Phyllis C., 7241 Waterford Dr., St. Louis

Stanford University

Tresch, Donald D., 200 S. Market St., New Athens, Ill.

February 13, 1959

Bouve Boston School

Haley, Ann T., 10 Elm St., Milltown, New Brunswick, Can.

University of California School of Medicine

Brown, Marcia A., 415 5th St., S. E., Minneapolis

Duke University School of Medicine

Skinner, Sandra Lee, 457 S. Ashland Ave., Lexington, Ky.

March 2, 1959

Albany Medical College

Culver, E. Dian, 38 West Ct., Appleton, Wis.

Columbia University
College of Physicians and Surgeons

Foti, Joseph F., 799 6th St., Watervliet, N. Y.

Duke University School of Medicine

Burgamy, William R., Jr., 3404 Shenandoah Dr., Macon, Ga.

Marquette University School of Medicine

Kamenshek, Dorothy M., 3818 Marburg Ave., Cincinnati

University of Southern California

Durham, Bryan C., 17 Stephen St., Hazlet, N. J.

Grady Vaughn School of Physical Therapy,
Baylor University Hospital

Harris, Barbara Jean, 3225 Vercheres St., Calgary, Alta., Canada
Huggett, Patsy J., 4701 Swiss Ave., Dallas, Texas
Lewis, Cassie Jean, 1660 McDowell Rd., Jackson, Miss.
McCarthy, John L., 2805 E. 77th Pl., Chicago
McMichael, Gene L., Box 95, Midlothian, Texas
McPherson, Dorn W., Lincolnshire Estates, Crete, Ill.
Moore, Eunice O., 61 W. Seneca St., McAlister, Okla.
Murray, Janna Dean, 2235 Mary Ellen, Pampa, Texas
Robinson, Terry M., 6701 Covington Lane, Dallas, Texas
Shelton, David S., 1173 Oakville Rd., Milan, Mich.
Thompson, M. James, Rt. 2, Stamford, Texas
Turner, Glenn A., Jr., 8424 San Fernando Way, Dallas, Texas
Walcher, James R., 900 Fannin, Amarillo, Texas
Womack, Phala A., 3908 Byers, Fort Worth, Texas

March 10, 1959

University of Texas

Barton, Barbara R., 5806 Portsmouth Ave., Houston, Texas

April 1, 1959

University of Buffalo

Jekel, Barbara Ann, 34 Summit Ave., Buffalo

College of Medical Evangelists

Miller, Michael, 1435 E. California, Glendale, Calif.
Ritchey, Henry C., 321-A Sinclair, Glendale, Calif.

State University of Iowa
College of Medicine

House, Alfred M., Jr., 18½ S. Clinton St., Iowa City

DECEASED MEMBERS

DR. HARRY A. BRITTON

Harry A. Britton died in Ithaca, N. Y. on February 17, 1959. Dr. Britton was born in 1881, and was graduated from Medico-Chirurgical School, Philadelphia in 1913. The cause of death was not given.

DR. THOMAS J. SCANLAN

Thomas J. Scanlan, Lebanon, Pennsylvania died on February 7, 1958 at the age of 54 of coronary occlusion. Dr. Scanlan was born in Shenandoah, Pennsylvania, September 17, 1903. He was graduated from Hahneman Medical College, Philadelphia, 1931. A veteran of World War II, he was associated with the VA Hospital in Lebanon.

DR. CHESTER F. McGUFFIN

Chester F. McGuffin, Calgary, Alberta, Canada died on September 8, 1958. Dr. McGuffin was graduated from the University of Western Ontario in 1904. He limited his practice to physical medicine from 1921 to the date of his death. The cause of his death is not known.

DR. THOMAS P. REEDER

Thomas P. Reeder, Newport Beach, California passed away in February of this year. He was born in October, 1911, was graduated from the University of Texas and licensed in the State of California in 1939. The cause of death was not given.

DR. ROBERT MULLER

Robert Muller of New York City died on January 12, 1959. Dr. Muller was born in Carlsbad, Austria in May, 1895. He was graduated from the University of Prague and was licensed to practice medicine in the State of New York in 1928. Cause of death is not known.

DR. SAMUEL B. KLEINMAN

Samuel B. Kleinman, Miami Beach, Florida died on July 18, 1958 of chronic granulocytic leukemia. Dr. Kleinman was born in Russia on January 3, 1914. He was graduated from Rush Medical College in 1938 and served internships at Municipal Contagious Hospital and Cook County Hospital in Chicago. Residency training was taken at VA hospitals in Minneapolis and Excelsior Springs, Mo.

DR. STELLA S. BRADFORD

Stella S. Bradford, Montclair, N. J., died in New York City on January 20, 1958. Dr. Bradford was graduated from Cornell University Medical College, New York City in 1902. She was a member of the American Rheumatism Association and for many years was associated with the Mountainside Hospital, as director of the department of physical medicine and rehabilitation.

Kirkegaard, Paul F., Cedar Valley Hospital, Charles City, Iowa

Marquette University School of Medicine

Sebastian, Sally L., 1003 Arthur Ave., Park Ridge, Ill.

Mayo Clinic

Seaquist, Margaret Ann, 4256 Toledo, St. Louis Park, Minn.

Ohio State University

Blaustein, Marlene G., 224 Northwood Ave., Dayton, Ohio

University of Texas Medical Branch

Blasingame, Betty N., 1350 Astor St., Chicago

Goodwin, Johnny B., 12 9th Ave., N., Texas City, Texas

Recent Publications by Members

William D. Paul, "The Medical Rehabilitation of Rheumatoid Arthritis"; Journal of the Iowa State Medical Society, April, 1959.

Albert M. Cohen, "The Role of Exercise in the Treatment of Postural Low Back Pain"; The Wisconsin Medical Journal, February, 1959.

The following papers were published in the American Archives of Rehabilitation Therapy, December, 1958:

Lewis A. Leavitt, "Geriatric Research and Rehabilitation."

Jacob L. Rudd, "New Horizons in Rehabilitation: in Treatment, Training and Research."

Edward T. Haslam and co-authors, "Hip Joint Prosthesis; Sovereign Remedy or Profligate Tool"; The Journal of the Louisiana State Medical Society, February, 1959.

The following papers were published in The Ohio State Medical Journal, February, 1959:

Keith C. Keeler, "Rx. — Light Duty: What Is It?"

Charles Long, "Tempered Optimism in Rehabilitation of the Severely Disabled Patient."

Arthur L. Watkins, "Therapeutic Exercise in Rheumatoid Arthritis"; Arthritis and Rheumatism, February, 1959.

O. Leonard Huddleston and co-authors, "The Writing Device"; The American Journal of Occupational Therapy.

The following papers were published in The Journal of The American Medical Association:

Frederic J. Kottke and co-author, "Factors to be Considered in Planning a Rehabilitation Service"; December 27, 1958.

Miland E. Knapp, "Problems in Rehabilitation of the Hemiplegic Patient"; January 17, 1959.

W. K. Lane, "Role of Pediatrician in Physical Fitness of Youth"; January 31, 1959.

Paul A. Nelson, "Physical Treatment of the Painful Arm and Shoulder"; February 21, 1959.

Herbert Kent, "Potential for Rehabilitation in Quadriplegic Teen-Agers"; February 21, 1959.

Roy H. Nyquist, "Brine Bath Treatments for Decubitus Ulcers"; February 28, 1959.

Edward J. Lorenze and co-authors, "Urologic Problems in Rehabilitation of Hemiplegic Patients"; March 7, 1959.

Books Received

Books received are acknowledged in this column as full return for the courtesy of the senders. Reviews will be published in future issues of the journal. Books listed are not available for lending.

Recent Advances in Cerebral Palsy edited by R. S. Illingworth; **The Care of the Geriatric Patient** edited by E. V. Cowdry; **Poliomyelitis: Papers and Discussions Presented at the Fourth International Poliomyelitis Conference; Rehabilitation, A Community Challenge** by W. Scott Allan; **Manual of Upper Extremity Prosthetics** edited by William R. Santschi; **Das Klapp'sche Kriechverfahren** by Bernhard Klapp; **The Female Offender** by Caesar Lombroso; **The Family Medical Encyclopedia** by Justus J. Shiffers; **Outline of Fractures** by John Crawford Adams; **An Experiment in Mental Patient Rehabilitation** by Henry J. Meyer and Edgar F. Borgatta; **Kinesiology, the Anatomy of Motion** by Ellen Neall Duvall; **Psychiatry in General Practice** by J. A. Weijel; **Pediatric Neurology** by Stanley S. Lamm; **Annual Review of Physiology Volume 21** edited by Victor E. Hall; **Rehabilitation of the Hand** by C. B. Wynn Parry; **Clinical Orthopaedics Volume 12** by Anthony F. De Palma.

Paraplegics Use Remote Control Typewriter

Some paraplegics will now be able to communicate by means of a remote control typewriter, operated with a beam from a small lamp attached to the patient's head.

The leg, arm, and other muscles of these persons are usually unable to function. However, the neck and head muscles normally can be controlled to some extent. Hence, patients can usually learn to operate the typewriter by controlling the beam of light, Dr. Alan Ziskind of the Boston City Hospital and Richard L. Ziskind of Boston report in the *Journal of the American Medical Association* (Jan. 31).

To operate the machine, the patient, by slight movement of the head, directs the beam of light onto a desired letter from an entire alphabet mounted on a photoelectric cell panel board. When the light strikes the letter, it triggers the corresponding letter on an electric typewriter coupled to the board.

A small switch that completes the circuit will be used by beginners, since it requires practice to avoid unintentionally sweeping over many letters in the process of selecting one. After the person becomes experienced at using the machine, he can forego the use of this microswitch. The switch can be controlled by an elbow, finger or other area of the body that can provide a small amount of muscle control and movement.

Some paralyzed persons were able to type about 30 words per minute. The machine is important because it helps rehabilitate many persons who must rely on the written word for communication.

TO BE PUBLISHED SOON . . .

Preliminary prospectus of the 3rd International Congress of Physical Medicine scheduled for Washington, D. C., August 21-26, 1960.

A copy of the prospectus may be had on request by writing to Walter J. Zeiter, M.D., Secretary General or Dorothea C. Augustin, Executive Secretary, 3rd International Congress of Physical Medicine, 30 N. Michigan Ave., Chicago 2, Illinois.

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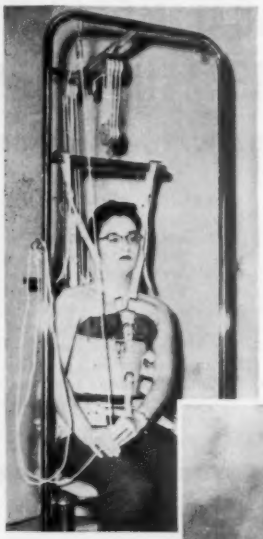

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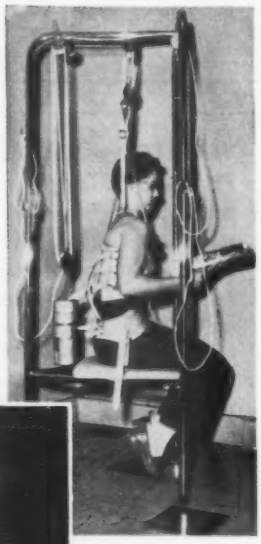

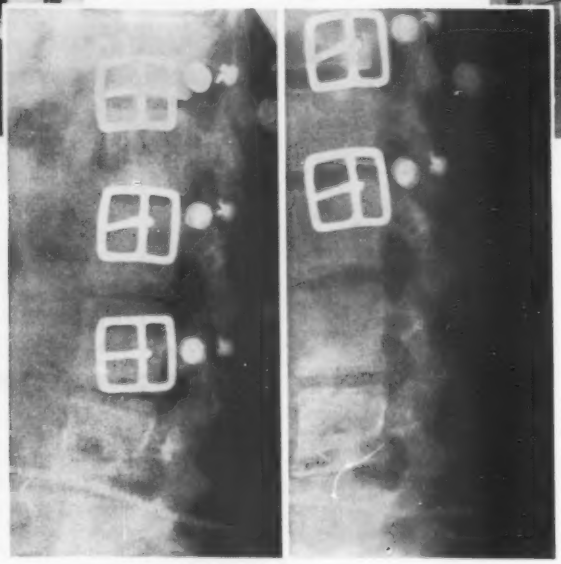

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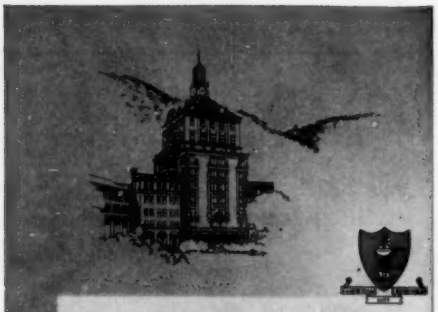

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- "Employment Outlook for Physical Therapists: A Survey of Salary and Personnel Policies" by Augustin & Ehmann. (Reprint from August, 1957 Archives of Physical Medicine and Rehabilitation)
- American Registry of Physical Therapists: Booklet of Information.
- Guide Law: An Act Defining and Regulating Physical Therapy, etc.
- By-Laws of the American Registry of Physical Therapists.

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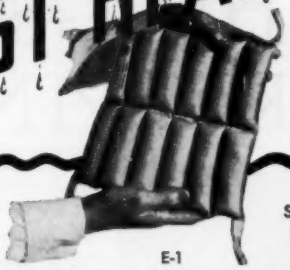

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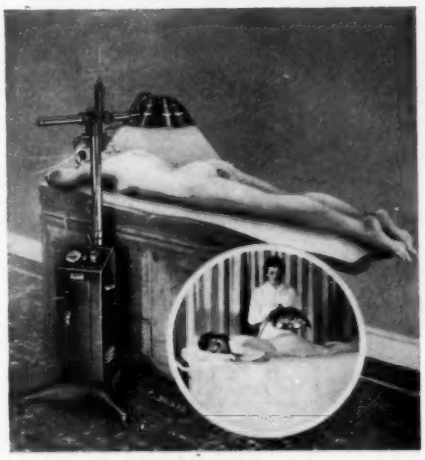

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